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Seamless Tube Mills Analyzed

Limitations and Advantages of Five Types and of
Nine Combinations of Processes—German
Steel Quality Criticized

BY PAUL CEBRAT*

STEEL tubes form a substantial part of the production of finished steel. The Jan. 7, 1926, Annual Review Number of THE IRON AGE stated that during 1925 there was produced in the United States approximately 3,339,000 gross tons of steel pipe, or 10½ per cent of the total of 32.5 million tons of steel rolled. Of this amount 42½ per cent was used for oil, gas and water and 21 per cent in buildings. Approx-

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mately two-thirds of the production went to two principal users. Of all the material used in the former industry, 53 per cent or over one-half was pipe and in the construction of buildings 12 per cent of the total steel used was in the form of pipe.

Corresponding figures for the previous three years show that the tonnage of steel pipe was 11½ per cent of the total steel rolled in 1924, 12 per cent in 1923 and 11 per cent in 1922. There is no reason why this percentage should decrease and, with the natural growth

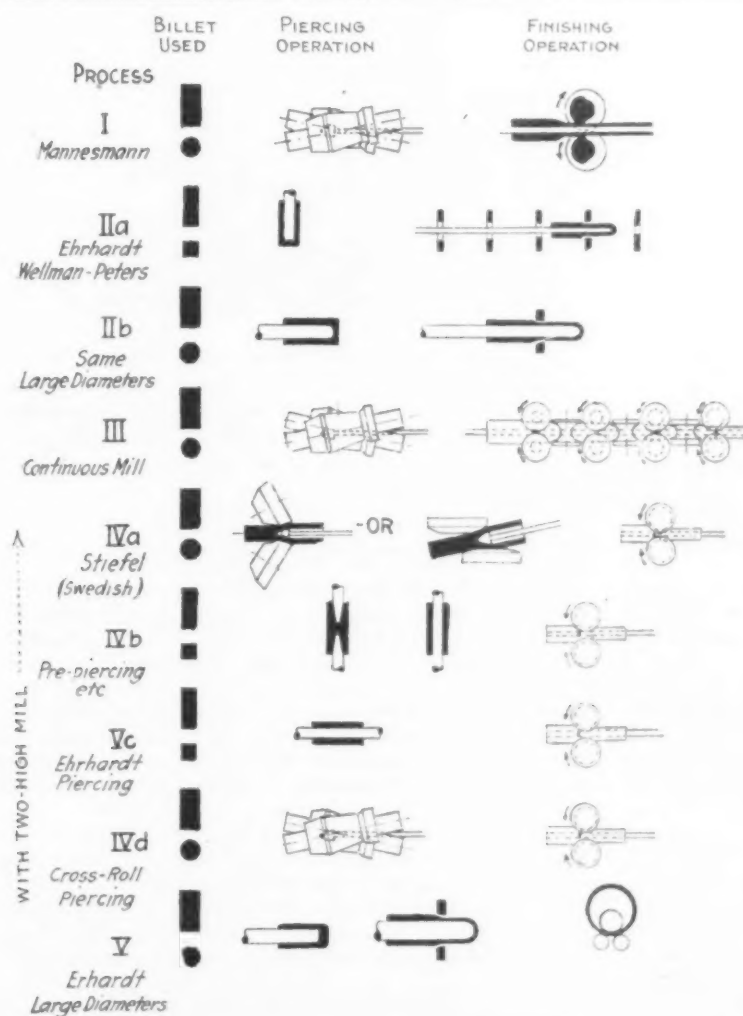


Fig. 1 — Comparison of Five Different Processes for Making Seamless Steel Tubes, Two of them with Variations. Four cases of round billets, two of hexagonal billets and three of square billets are shown. Crossed rolls are used for piercing in three cases, Stiefel rolls in one and punching in five. Pilger rolls are used for finishing in one case, draw or push bench in two, continuous rolls in one, two-high rolls in four and inside and outside rolls for the last

in tons of rolled steel produced, the tonnage of steel pipe will increase correspondingly.

In the manufacture of rolled steel tubes in this country the butt weld and lap weld processes are used to the greatest extent. There exists, however, an ever increasing demand for seamless tubes which, on account of their superior qualities, are, for certain purposes, almost exclusively used and demanded. Seamless tubes are required, for instance, for oil-well casings, drill pipes, boiler and superheater tubes, etc. Another large consumer using seamless tubing in increasing quantities, and replacing with it other forms of steel, is the automobile industry. Building construction also looks favorably on seamless tubing, it being less expensive than brass and unquestionably superior to welded pipe.

Seamless Tubes in the United States

A few American mills are producing such tubes, the majority using either Mannesmann or Stiefel type piercing mills and in connection therewith continuous or automatic mills. Others employ push benches on

Very little has been published in this country on this subject. One article in THE IRON AGE† by E. R. Kelso described the automatic mill of the Weldless Tube Co., Wooster, Ohio. A series of four articles in THE IRON AGE of April 7, 14, 21 and 28, 1921, gave the theory in considerable detail. This was a translation from *Stahl und Eisen*. An article by E. F. Ross in *Iron Trade Review*‡ describes a recently-built English push-bench plant and continues with a short but instructive discussion of the Pilger process.

The following observations, made by the writer during a recent study trip to the Continent, may, therefore, be of interest.

Germany has, since the war and practically for some years before the war, almost entirely eliminated the manufacture of lap-welded tubes, with the exception of the very large sizes (over 20 in. in diameter) which are usually water-gas welded. And even boiler shells, turbine rotor drums and other high-pressure vessels and containers up to 11½ ft. in diameter are in Germany now being made seamless.

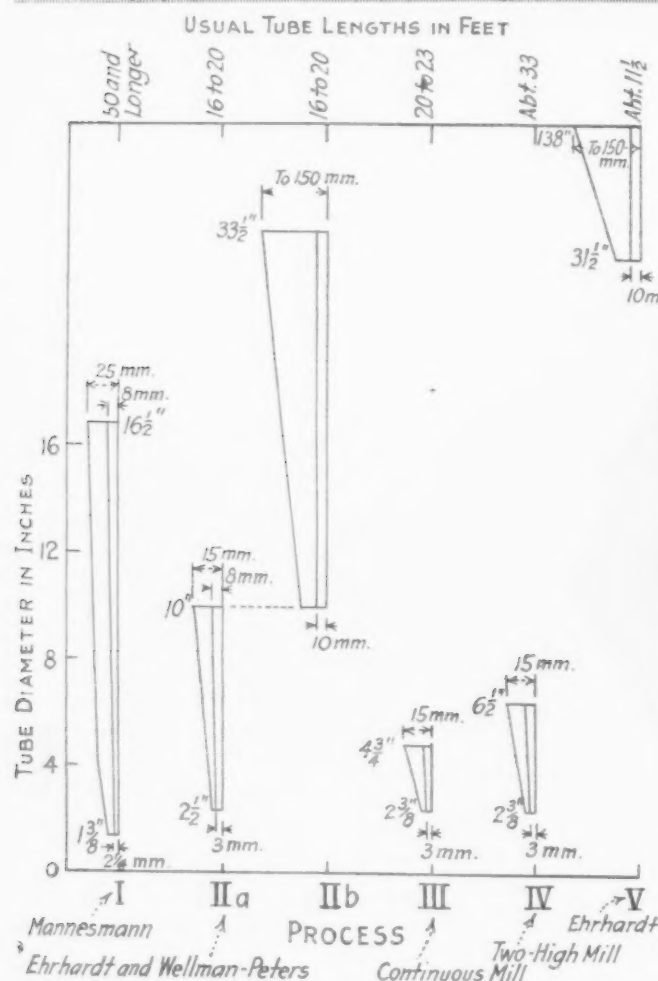


Fig. 3 (at Left)—Diagrammatic Comparison of the Practical Limitations on Sizes Made by the Different Processes. Dimensions shown in inches represent tube diameters, maximum and minimum; those in millimeters, wall thicknesses, also maximum and minimum

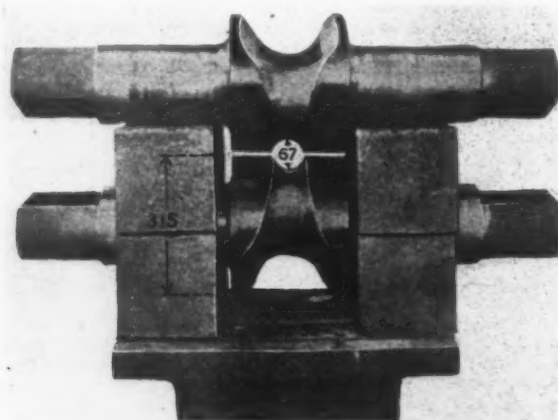


Fig. 2—Pilger Rolls for Forging Tubes Pierced by the Crossed Rolls of the Mannesmann System. In the set shown the finish diameter of the tube is 67 mm. (2½ in.) and the roll diameter 315 mm. (12½ in.)

which cupped plates are drawn out into tubes or bottles, while one small plant has had an antiquated hand-operated Pilger mill in operation for a number of years.

Seamless steel tube tonnage produced in the United States during the past few years has varied from 118,000 tons in 1921 to 404,000 tons in 1923. Percentages correspondingly have varied from less than 6 to almost 13 per cent of the total pipe and tube production. The figures are shown in gross tons in the table below:

	Total Pipe and Tubes	Seamless Tubes	Percentage
1917.....	2,486,977	226,675	9.11
1918.....	2,290,479	292,894	12.79
1919.....	2,374,931	197,369	8.31
1920.....	3,002,725	291,570	9.71
1921.....	1,987,442	117,884	5.93
1922.....	2,732,236	257,835	9.44
1923.....	3,351,023	403,782	12.05
1924.....	2,824,256	261,157	9.25
1925.....	3,339,000	.....	.....

†Jan. 3 and Jan. 10, 1924, pages 57 to 60 and 159 to 162.
‡Oct. 29, 1925, page 1079.

Production of steel tubes in Germany for January to October, 1925, was 553,139 metric tons, or 6¼ per cent of the total steel rolled in that period. According to trustworthy information, this production can be divided into 70 to 75 per cent seamless tubes and 30 to 25 per cent small butt-weld and large water-gas welded tubes. Of the total production of seamless tubes not less than 75 per cent are manufactured by the Pilger process and the remainder in Stiefel mills, Ehrhardt mills, push benches and others.

In France, now including the Saarland and Alsace-Lorraine, and in Belgium similar relations exist. England is still making a considerable amount of lap-welded pipe in the medium sizes (6 to 12 in.). The figures for that country are said to be about 50 per cent seamless and 50 per cent butt and lap-welded tubes.

Pilger Process Especially Useful

It is particularly the Pilger process which, on the Continent and especially in Germany, has been devel-

oped to a certain degree of perfection. By this means are produced economically tubes of the desired qualities and of considerably greater length than the common mill length of about 20 ft., which usually command a premium over the price of lap-welded tubes. This has induced some American manufacturers to study this process and its advantages, together with the commercial aspects, with the result that two large concerns have purchased Pilger mills in Germany.

Other concerns are contemplating similar installations, as it may be expected that not only the normal steady increase in steel tube requirements will be principally in seamless tubes—except probably in the small sizes commonly used for gas and water piping, conduits, etc.—but that the market for lap-welded tubes will become continually smaller, seamless tubing being preferred and demanded, where up to now lap-welded material has seemed sufficient.

An indication that this assumption may be considered justified lies in the fact that, with an increase in 1925 of 19 per cent in total rolled steel production over 1924, the amount of steel pipe fell from 11½ per cent to 10½ per cent of the total. This may be due partly to the importation of considerable tonnages of seamless tubing from Germany and Belgium, which was largely used in the oil fields.

Various Processes

Before going further into details it may be well to review briefly the different methods in use on the Continent for producing seamless tubes. This can best be done by quoting from an article by Ewald Röber of Düsseldorf, published in *Stahl und Eisen*, Feb. 16, 1922, page 253, although some changes and further developments have taken place since then. This article does not include the automatic mill, which is being widely used in this country, but no mill of this type is in operation in Germany. Mr. Kelso's article, however, gives a full description of such a mill and it has, therefore, been omitted from this discussion.

The following principal methods are in use in the manufacture of seamless tubing, as illustrated diagrammatically in Fig. 1.

- I—Piercing mill and Pilger mill (Mannesmann process).
- IIa—Piercing press and push bench (Ehrhardt and Wellman-Peters process).
- IIb—Piercing press and draw bench for large diameter tubes.
- III—Piercing mill and continuous mill.
- IVa—Piercing mill (Stiefel system) and two-high (plug) mill (Swedish process).
- IVb—Pre-piercing and piercing press and two-high mill.
- IVc—Piercing press (Ehrhardt) and two-high mill.
- IVd—Piercing mill and two-high mill.
- V—Piercing press, draw bench and special rolling mill (Ehrhardt system), for hollow bodies of large diameter.

The principle of the piercing mill, either Mannesmann or Stiefel system, is well known and has been described in Mr. Kelso's article, as well as in the 1921 series. To review briefly, either a cast or rolled round of a somewhat larger diameter than the tube to be rolled, after being thoroughly heated, is delivered to the feed trough of the piercing mills. It is pushed forward until it is gripped between the working rolls of this mill. These conical rolls are inclined 5 to 8 deg. to the horizontal plane, in opposite directions, and are rotating in the same direction. A tapered plug is carried and held in position by a rod, the distance between the rolls and the greatest diameter of the plug determining the outside diameter and the wall thickness of the pierced round.

The round gripped between the rolls is now forced to rotate between the rolls and, on account of their inclination, is moved forward and pulled over the plug. The rolls, exerting pressure on the outside of the round, while it is rapidly rotating, at the same time moving it forward, cause a stretching of the inner fibers. The rough and irregular hole created is smoothed and limited to a certain size by the pierced round being shoved over the plug. The piercing process is, therefore, the result of three operations:

- 1.—The rolling between cross rolls, which creates the hole in the center;
- 2.—The forward movement, which pushes the outer fibers of the round forward between the rolls;

3.—The resistance of the plug, which forces the inner fibers outward along the conical surface of the plug.

Instead of the piercing rolls, system Mannesmann, conical rolls or conical disks (system Stiefel) are sometimes employed, although less frequently, and their operation is based on the same principle.

The piercing plug and its supporting rod are held in position against the forward movement of the ingot by a hinged abutment gate. After piercing, this gate is swung open, the hollow round taken off the plug rod and conveyed to the Pilger mill. A new plug is then put on the rod, the gate closed and the mill is in readiness for piercing the next bloom.

Operation of Eccentric Rolls

Contrary to the other tube-rolling and drawing processes, the practice on which the Pilger process is based is carried out by a single pair of rolls, which are fitted with an eccentric groove, as shown in Fig. 2. The thick-walled hollow ingot drawn over a cylindrical steel mandrel or Pilger rod is introduced into the rolls against their direction of revolution. During about one-half of a revolution the two rolls with their eccentric groove force back the hollow bloom a certain distance, at the same time reducing its cross section, whereas, during the next half revolution of the rolls the feeding device attached in front of the housings pushes the block forward again, a little farther than it has been previously thrown back.

A compressed air cylinder feeds the hollow ingot into the rolls, an air receiver taking up the recoil when

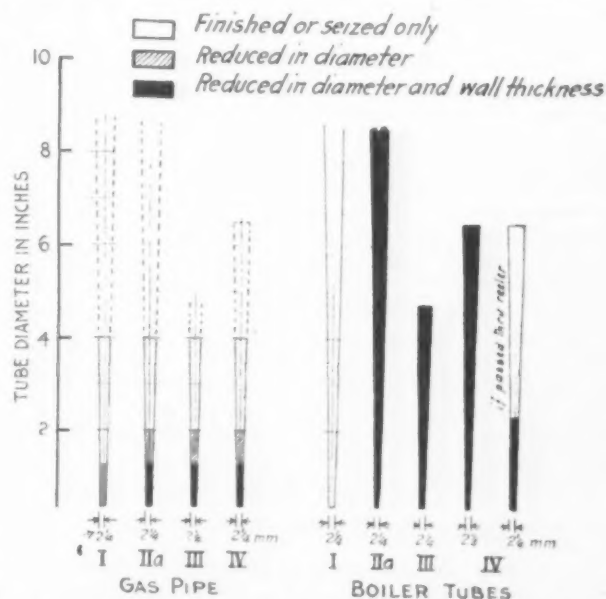


Fig. 4—Steps Necessary to Produce a Finished Seamless Tube by Each of Four Processes: I—Mannesmann; IIa—Ehrhardt and Wellman-Peters; III—Continuous Mill, and IV—Two-High Mill. To go below 1½ in. for gas pipe in process I the tube must be reduced in diameter, by hot or cold drawing. The same is true, below 2 in. diameter, in the other processes; below 1½ in., these must have wall thickness, also, reduced by drawing. For boiler tubes a similar procedure is followed, as shown

the blank is pushed back, while a long hydraulic cylinder moves the whole feeding device forward by steps, corresponding with the advance of the ingot into the rolls at each revolution. The front end of the piston rod of the feeding device bears a long pitch thread. In going through a bearing with a ratchet, this turns the hollow ingot 90 deg. at each forward movement, thereby insuring a uniform working of the rolls on all sides of the tube and consequently uniform wall thickness and roundness of the tube.

By this alternating forward and backward "Pilgrimage" (hence the name of this process) of the hollow ingot, it is drawn out to a smooth, thin-walled

tube so quickly that it loses comparatively little of its original heat.

Piercing Press and Push Bench

Process IIa has been fully described in Mr. Ross's article similar to the German article. The German author claims that tubes up to 10 in. in diameter can be produced by this process. This has not been found practical or economical and $5\frac{1}{2}$ in., as given in Mr. Ross's article, or possibly a maximum of 6 in., can be accepted as the practical limit.

Process IIb is, in principle, the same as IIa, but with the modification that the dies are not arranged in multiples on a draw-bench or push-bench, but singly. After the hollow billet has passed through one die it is reversed with the mandrel, a new die set up and this is repeated until the tube has the required wall thickness.

Using a Continuous Mill

In process III a solid round ingot or bloom is pierced in the piercing mill and is then rolled out in the same heat over a long mandrel in a continuous mill. This consists usually of seven one-pass rolls with decreasing pass diameter, vertical and horizontal rolls alternating.

In process IV different methods for piercing the solid ingot, bloom or billet are in use. In IVa they are pierced in a Mannesmann system piercing mill, in IVd in a Stiefel system mill. In IVb a plug is driven into the square billet from both ends approximately to the center, after which it is pierced through on a second press with a larger die. In process IVc a piercing press similar to process IIa is employed, with the difference, however, that the hole goes through and no bottom is left.

For the finishing a two-high mill is used in all cases. This mill consists of several stands with rolls 48 to 72 in. long and containing several passes, in which the hollow billets are rolled into tubes over a plug. Usually, and particularly in IVb and IVc, a few passes are given, the piece then hot sawed in two or more pieces, reheated and given more passes. After that the tubes pass normally through a reeling or polishing mill, which smoothes them inside and outside and equalizes the wall thickness. After that it goes through a sizing mill to the cooling bed.

Process V is the well known Ehrhardt system, in which heavy presses are employed to pierce large rounds or octagonal ingots, similar to process IIa and IIb. These are then drawn out as in process IIb. The bottom then is cut off and the hollow body rolled out in a special mill, in which rolls outside and inside of the hollow cylinder work on the material.

Limiting Sizes by Various Processes

Fig. 3 shows, according to Mr. Röber's article, the diameters, normal lengths and wall thicknesses that can be produced successfully by the different processes.

By process I—Piercing and Pilger Mills—tubes can be rolled from $1\frac{1}{2}$ in. to $16\frac{1}{2}$ in., with wall thicknesses of standard boiler tubes as a minimum or from 2¼ mm. (0.1 in.) to 8 mm. ($\frac{5}{16}$ in.) normal, and 25 mm. (1 in.) maximum.

This statement, made in February, 1922, must be amplified in that now seamless tubes are made by the Pilger process up to 20 in. diameter and wall thicknesses up to $1\frac{1}{4}$ in. and $1\frac{1}{2}$ in. It is as yet a more or less debatable question what is the limit in large size seamless tubes that can be rolled successfully and economically by the Pilger process.

Most of the Continental mills do not make tubes larger than 15 in. outside diameter, although one or two plants are rolling up to 18-in. and 20-in. tubes. One of the serious objections to "pilgering" seamless tubes above 15 in. or 16 in. is the size and cost of machinery required above certain limits, including the driving motors, all auxiliary equipment, furnaces and handling, machinery which would assume rather excessive proportions.

Furthermore, the quality of the steel in the large ingot to be pierced is of prime importance and, con-

sidering the complaints now raised by seamless tube mill men, no doubt presents increased difficulties. As a solution of this problem experiments are being made with "expanding mills," which are machines built somewhat on the principle of a conical roll piercer.

Expanding Large Diameters

It is claimed that, by pilgering a tube with a wall thickness above that finally required, reheating it and putting it through the expanding mill over a specially designed tapered plug, the diameter can be increased as much as 4 in. It is claimed also that the same process could be done twice, for instance—rolling a 12 in. tube and expanding it to 16 in., and this again to 20 in. It is natural to expect that such a process will subject the metal to enormous strains and the slightest defects in the steel would be enlarged, seams opened up, etc. Results of experiments with these machines will be extremely interesting.

In regard to the stated limit of $1\frac{1}{2}$ in. diameter, this, also, should be modified, as the smallest tubes which were observed being rolled by this process were $1\frac{1}{4}$ in. Tubes made by this process are usually produced in lengths from 39 to 50 ft., but can be made even longer, if desired, this being one of the advantages.

Ehrhardt and Wellman-Peters Process Not Economical Above 6 In. Diameter

In process IIa the smallest tubes are $2\frac{1}{2}$ in. outside diameter; the largest, according to the German author, 10 in. As stated previously, however, it has not been found economical to go beyond 6 in. No tubes under $\frac{1}{8}$ -in. wall thickness are made and the usual length is 16 to 20 ft. Within this range this type of plant eventually competes successfully with the Pilger mill in regard to tonnage and economical operation.

Process IIb is a development of the former process. Tubes up to $33\frac{1}{2}$ in. outside diameter and 6 in. wall, in lengths of average 18 ft., are now produced. High-pressure gas containers and similar articles are usually made by this method.

By process III tubes from about $2\frac{3}{4}$ in. to 4¼ in. outside diameter and by process IV from about $2\frac{3}{4}$ in. to 6¼ in. outside diameter are produced. Wall thicknesses of such tubes are not below $\frac{1}{8}$ in. and not over $\frac{5}{16}$ in. normally, and $\frac{5}{8}$ in. maximum. The rolling length is, in process III, usually about 23 ft., and in process IV up to 33 ft.

Exceptionally Large Diameters Made

Large hollow seamless bodies such as boiler shells, turbine rotor drums, etc., from $31\frac{1}{2}$ in. to $11\frac{1}{2}$ ft. in diameter, with wall thicknesses from $\frac{7}{16}$ in. to 6 in. and in short lengths, not exceeding $11\frac{1}{2}$ ft., can be produced by process V.

Fig. 4 is a diagram indicating the steps which have to be taken to produce a finished seamless gas pipe or boiler tube, after it has gone through the various processes enumerated above.

Seamless gas pipes made by the Pilger process (process I) can be considered finished as pilgered down to about $1\frac{1}{4}$ in. For smaller tubes a reduction in diameter is necessary. This can be done down to a certain diameter in a reducing mill or to the smallest diameters by hot or cold drawing. Tubes made by processes IIa, III and IV must be reduced in diameter from about 2 in. diameter down, and on tubes below $1\frac{1}{4}$ in. the wall thickness, also, has to be reduced by drawing.

Boiler tubes can be finished rolled in the Pilger mill down to $1\frac{1}{4}$ in. Mr. Röber's article claims 32 mm. ($1\frac{1}{4}$ in.) as the lower limit but, as stated before, experience has proved that the pilgering of tubes below $1\frac{1}{4}$ in. is not practical nor economical and it is not practised. The rolled boiler tubes are sometimes passed through sizing rolls for exact diameter. In all other processes a reduction in diameter, as well as in wall thickness, is necessary.

(To be concluded)

What Is "Combustibility of Coke"?

Laboratory Conception of Little Value in Actual Blast Furnace Practice—Agreement on Terminology Needed

BY RALPH HAYES SWEETSER*

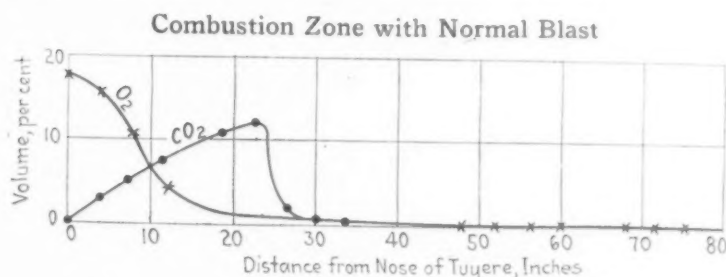
PRACTICAL blast furnace men are now at loggerheads with many technical investigators over the meaning of the words "combustibility of coke." Because of this misunderstanding, there is danger that much misleading information will get into technical literature regarding the combustibility of blast furnace fuels. Already several articles have been published in this country and in England which contain statements entirely contrary to the general understanding of blast furnace men in this country and on the other side.

The difference in interpretation has been carried into the meetings of the iron and steel section of the American Institute of Mining and Metallurgical Engineers, and the West of Scotland Iron and Steel Institute, and

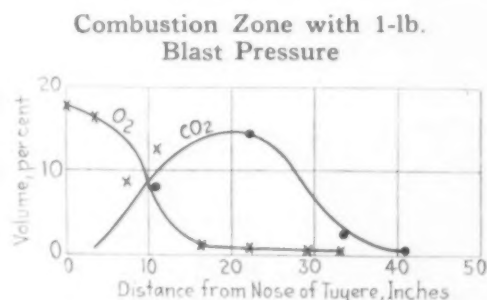
the rate of blowing the furnace was deliberately slowed down so that the blast was at only 1 lb. pressure. The results of the test were published by Kinney in the June, 1925, issue of *Blast Furnace and Steel Plant* under the title of "Combustion of Coke at the Tuyere Level of the Blast-furnace." In the article the author said:

To determine the extent of penetration of the combustion zone with a variation in air pressure, it would be desirable to double the blowing capacity of the engines at some blast furnaces, but as this was not practicable in this case, it was decided to reduce the blowing pressure to a minimum, and then make a survey of the hearth area.

Both Columbus furnaces were in blast at the time of the experiment, and the results of the investigation



Analyses of Gases at Tuyere Level in East Furnace, American Rolling Mill Co., Columbus, Ohio, Show that the Amount of Blast Has Little Effect on the Size of the Combustion Zone. The wind, in this instance, was 26,625 cu. ft. per min.; the make, 316 tons of basic pig iron per day; the consumption of coke (by-product), 2110 lb. per ton of pig iron



Analysis of Gases at Tuyere Level in East Furnace, Showing Extent of Combustion Zone with Very Small Volume of Blast

has been discussed in the trade journals in this country and in Great Britain. At the February, 1924, meeting of the American Institute of Mining and Metallurgical Engineers, the discussion of the topic became so warm that Arthur G. McKee, blast furnace engineer, Cleveland, said, "It is evident that we all need to get the right definition for the combustibility of coke, because we are not all talking about the same thing."

In July 30, 1924, issue of *Coal Review* is printed serial No. 2604, Reports of Investigations, Bureau of Mines, by T. L. Joseph, associate metallurgist. The subject is "Combustibility of Coke and Rate of Combustion." In the article the author states:

The combustibility of coke refers, therefore, to those properties that determine the size or extent of the combustion zone. . . . The rate of carbon gasified at the tuyeres of a blast furnace is independent of coke combustibility. . . . A fast-burning coke will burn in a more restricted volume than a slow-burning coke, but both types of fuel will be consumed at rates determined by the supply of oxygen.

Supply of Air and Size of Combustion Zone

S. P. Kinney, Bureau of Mines, has gone so far as to determine that the size of the combustion zone in front of the tuyeres of a blast furnace does not vary much under changing conditions in the amount of wind blown. In May, 1923, Kinney conducted a series of tests at the two blast furnaces of the American Rolling Mill Co., Columbus, Ohio, and determined the size of combustion zone in a furnace, working under normal pressure and normal volume of blast, and then when

of the hearth conditions, as to the size of the combustion zone and the point at which the combustion of the coke was complete, are summed up by Kinney in his summary and conclusions as follows:

It has been shown that the extent of penetration of the combustion zone at the tuyere level of the blast furnace is constant, not depending upon the amount of air blown.

This conclusion is right, according to the charts Nos. 1 and 2, and seems to accord with other experiments of the Bureau of Mines and actual practice. The conclusion, however, is contrary to that of Joseph, who says, as quoted above: "A fast-burning coke will burn in a more restricted volume than a slow-burning coke."

Of all the recent articles published on the combustibility of coke in the blast furnace, the one that seems nearest correct in its conclusions is that of Daniel Sillars, who gave an address entitled "Recent Views of Blast Furnace Functions" before the thirty-second session of West of Scotland Iron and Steel Institute at the Royal Technical College, Glasgow, Scotland, Feb. 20, 1925. The address is published in Vol. 32, Part IV of the journal of the institute. On page 56 of this issue, Mr. Sillars is quoted as follows: "Combustibility is, therefore, a measure of the speed of the combination of oxygen and carbon to form carbon monoxide."

Tests of Finely Ground Fuel Give Unexpected Results

Another report from Great Britain published in the September, 1925, issue of *Fuel in Science and Practice* seems to prove that anthracite has greater combustibility than coke. At the annual meeting of the Society of Chemical Industry, E. C. Evans presented a paper

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giving reports on a test of the reactivities of coke devised by the Federal Research Board and the National Federation of Iron and Steel Manufacturers. A brief description of this test states:

It consists in passing 100 cc. of carbon dioxide during 10 min. over a standard volume of coke of 10 to 20-mesh size, maintained at 950 deg. C. After absorbing the unchanged carbon dioxide with potash solution, the carbon monoxide formed is collected and its volume measured. The complete reduction of the dioxide according to the equation, $\text{CO}_2 + \text{C} \rightarrow 2 \text{CO}$, would give 200 cc. of carbon monoxide, and, in fact, very nearly this volume was obtained from active carbon, lignite char and coke made by the Maclaurin process. The lowest value, 30 cc., was given by a specimen of beehive coke made from Durham coal. Anthracite, however, which is commonly supposed to be of low combustibility gave the surprisingly high figure of 124 cc. Another seeming anomaly was the value of 133 cc. obtained from coalite, which is a lower one than that given by many samples of ordinary gas coke. Such results may indicate the necessity for the revision of current ideas as to the relative combustibilities of different forms of carbon. It is however, quite likely that the method, which is admittedly only provisional, may be found to be unsuitable.

A careful study of this test will show exactly what is wrong in the seeming conflict between the technical men and the practical blast furnace men.

Laboratory Tests Not Conclusive

When a blast furnace man talks about the combustibility of coke he refers to the rate of burning, at the tuyères, of the particular coke which he is using, and *he is not concerned with the rate of burning of that particular coke in a laboratory after it is ground to pass through a 20-mesh sieve.* The laboratory experiment presupposes preparation of the fuel, so that there will be intimate contact between the finely ground fuel and the gases or the oxygen which will react upon the carbon of the fuel.

On the other hand, the blast furnace man has coke of certain chemical composition, size, structure, porosity and hardness, the hardness sometimes having the additional variation of a dense "skin" on the surface. The blast furnace man has to burn the coke under certain blast pressures and blast temperatures, and he has to flux the coke according to the amount of ash and sulphur in it. He has to handle the volume of blast according to the rate at which the furnace can be driven, and this rate of driving is sometimes restricted by the combustibility of coke. If the coke is very combustible, then the maximum limit of the driving depends on whether he can keep the furnace full and whether he can take care of the products and by-products of the furnace.

Laboratory and Furnace Conditions Not Comparable

The technical research man in his laboratory is dealing with finely ground fuels, and with very small

quantities, and he has the added difficulty of having only a certain amount of fuel to burn. On the other hand, the blast furnace man no sooner burns a certain amount of fuel in front of the tuyeres than an equal amount of fuel flows into the combustion zone, is burned, and passes on to the interior of the furnace. It is impossible to compare the two sets of results.

Practical blast furnace men appreciate the research work done by technical men, especially those of the United States Bureau of Mines. In some respects, the work recently done constitutes the most progressive investigation that has been made since the test of Sir Lowthian Bell, but further results of laboratory research should not be reported in terms that are contrary to those used in the practice of making pig iron. This article has been written with the aim of bringing practical men and technical investigators in this country and abroad to an agreement on terminology in discussing the combustion of blast furnace coke.

Physical Qualities of Coke Affect Combustion

H. A. Brassert, Chicago, was probably the first man to investigate the combustibility of cokes. It was first brought to his attention in 1906 (year book American Iron and Steel Institute, 1914, page 27). Brassert says:

What principally concerns the blast furnace is the rate of progression of the combustion, which depends not so much on the chemical analysis as the physical qualities of the coke. It is this rate of progression that we term combustibility, which is the speed at which the carbon molecules in the coke combine with oxygen under given conditions.

At the February, 1924, meeting of the American Institute of Mining and Metallurgical Engineers, in discussing the paper of P. H. Royster and T. L. Joseph on "The Effect of Coke Combustibility on Stock Descent in Blast Furnaces," the author suggested a modification of Brassert's definition of combustibility of coke. This is given on page 233, Vol. LXX of the transactions of that society. The writer now wishes to make some slight changes in that definition and would suggest the following wording:

The combustibility of a blast furnace coke is the rate of complete gasification of that particular coke in front of the tuyères of a blast furnace under standard conditions of blast temperature and of blast volume.

It is not sufficient to compare the combustibility of different cokes in a laboratory when ground so fine that all the particles are easily exposed to the hot air or hot gases. The combustibility of different cokes must be compared under the conditions which exist in those cokes when delivered to the blast furnace.

The two charts shown prove conclusively that the size of the combustion zone is not dependent upon the quantity of coke consumed in a given time. Unfortunately, there is not at present a means of measuring the exact amount of coke passing through this combustion zone, but it could be approximately calculated.

Internal Structure of Steel

Knowledge of How to Control These Changes Sought in Cooperative Work

In order to develop a suitable combination of strength and toughness in steel for severe service, as in airplanes and automobiles, it is heat treated by quenching and tempering processes which alter the internal structure of the metal. The more that is known about the mechanism of this alteration in structure, the more intelligently can heat treatment be applied, according to the Bureau of Standards.

By heating very slowly through the temperature at which the structure changes and observing the electrical resistance of the steel at different temperatures it is possible to follow this change in greater detail than when the usual method of "thermal analysis" is applied.

Such an application of the resistance method has been made by the research associate of the American

Society for Steel Treating, stationed at the Bureau of Standards. This work corroborates the previously known fact that the elements silicon and manganese, both of which are present in varying amounts in steel according to the properties desired, have quite different effects upon the temperature at which the structural change takes place. It has been known that manganese lowers and silicon raises this temperature. The resistance method shows this and also shows that, instead of occurring at a single definite temperature, the change occurs over a definite range of temperatures, and that the range due to manganese can be altered by previous heat treatment tending to make the steel more or less homogeneous in composition, while that due to silicon is not thus altered. Steel sufficiently high in both manganese and silicon shows by the resistance method two separate and distinct ranges of temperature at which the structure of the steel changes while the constituent which the metallurgist knows as pearlite is being brought into solution into another constituent known as austenite, as the steel is heated.

Refractories at Mellon Institute

Work of the Fellowship in Research and in Testing

—Consumer and Producer Both Benefited

—Notable Publications

BY M. C. BOOZE*

THE refractories fellowship was established at Mellon Institute by the Refractories Manufacturers Association in 1917 and has grown constantly in the amount and scope of its work since that date. Raymond M. Howe, whose pioneer work in the refractories research field earned for him a wide and enviable reputation, was the first incumbent of the fellowship, and he continued in charge of the work until 1923, one year before his death.

Until the establishment of this fellowship, there were few attempts by manufacturers to control the quality of their raw materials and products, because of the lack of testing methods and the expense involved in setting up individual laboratories. It soon became evident that the establishment of control tests was an important part of the work to be accomplished and the efforts of the fellowship were largely concentrated in this direction.

As confidence in these tests became established and the value of the results became known, the volume of such work increased rapidly until it was necessary to increase the personnel. This expansion has continued until today the testing division alone employs six men and a wide variety of chemical and physical tests are carried out.

Research and Testing Work

That research work has not suffered unduly by the attention paid to testing is evidenced by the fact that no less than 33 investigations have been completed and the results published. During the early life of the fellowship these investigations were largely concerned with the development of suitable tests and, while there is much that remains to be done on these tests, the information obtained is invaluable. The knowledge gained by the fellowship from tests made on refractory materials and products for individual manufacturers was a great benefit. It has also frequently been the case that information from tests has indicated the need for research investigations along other lines, and so it has served several purposes.

It was to be expected that the problems investigated would be those of the manufacturer rather than the consumer, since the former provided the necessary funds for the work. The manufacturers are to be complimented, however, in taking an unselfish attitude toward the work and allowing investigations to be conducted that were only of indirect benefit to themselves. A study of the list of published articles, which is ap-

ended, will show that a considerable number of the investigations were of this nature.

With the growth of the fellowship and because of the confidence placed in it, the scope of its work naturally became broader. Technical problems arose which were referred by the manufacturer or consumer to the fellowship, complaints of peculiar nature were investigated, new products were developed and data requiring peculiar tests were requested on specific brands of brick.

Until recently there was no sharp separation of research and testing work, with the result that the research investigations were not pushed rapidly to completion and suffered whenever the volume of testing work became unusually heavy. However, when the fellowship was transferred from the Refractories Manufacturers Association to the newly formed American Refractories Institute, it was reorganized to include research and testing divisions, each to be operated separately from the other. The complete organization of the fellowship is shown on the preceding page.

Work of the Testing Division

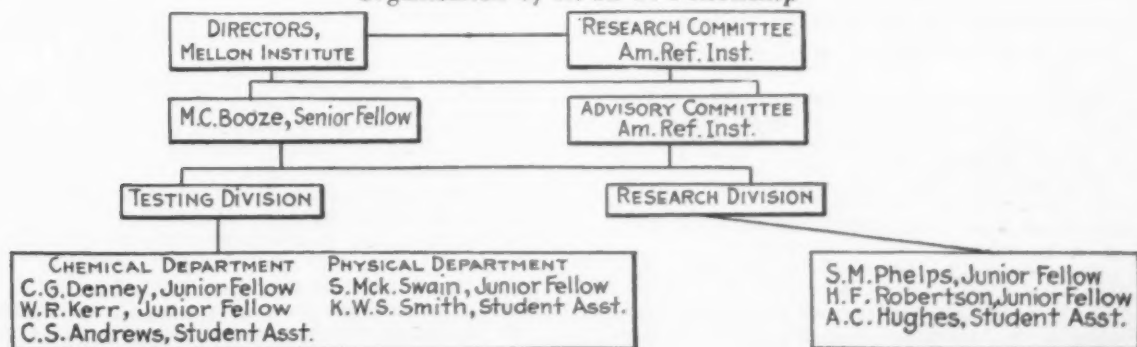
The testing division is self-supporting through charges that are made for individual tests, these charges being adjusted as nearly as possible to just meet the expense involved. In the event that there is any surplus, the balance will be used to help defray the expense of the research division. The tests that comprise most of the work done by this division are complete and partial chemical analyses, fusion tests, load tests, spalling tests and reheating tests.

In addition to these, tests are frequently made for cold strength, porosity, absorption, specific gravity, coefficient of expansion, slag penetration, screen analysis, rate of shrinkage, softening point of slag-brick mixtures and physical analyses of refractory mixtures. Requests have been received for data on relative thermal conductivity, diffusivity, hot transverse strength, chemical solubility, disintegration by carbon monoxide and a number of other properties requiring the devising of new testing methods and special apparatus. In several cases the testing division has been called upon by individual manufacturers to develop products for special purposes with a fair degree of success.

Another phase of the work, included under testing, is the investigation of complaints by consumers and visits to plants of manufacturers. In a number of such instances the fellowship has been able to be of material benefit through definitely locating the cause of the complaint or the manufacturing difficulty. In other cases the fellowship has been able to determine the

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Organization of A. R. T. Fellowship



cause for failure by physical or chemical tests made on samples taken from furnaces and sent to the laboratory. The men engaged on testing work are subject to call by any of the members of the American Refractories Institute for limited periods at a definite rate of charge and this service constitutes no small part of the work.

The fellowship renders further service by giving free consulting advice on problems related to the manufacture or use of refractories. The average number of letters, answered daily in which information is requested, is surprisingly large.

The Research Work

Of the research work carried out since its inauguration, a large part has been on the consumers' problems and attempts to determine the type of material best suited to certain furnace conditions. Very few investigations have been started having for their sole object savings in manufacturing costs or benefits for the manufacturers alone. This industry is somewhat unique in having had to devote so much time to studies of its customers' service conditions, both by collective effort and endeavors on the part of individual producers. It is only within the last few years that there have been earnest attempts made by consumers to determine accurately what these service conditions are, and there is a large amount of such information yet to be obtained. In order to develop products to meet more severe conditions, it is necessary to know what those conditions are, and consequently the frequent criticisms made against the refractories industry for lack of advancement are hardly justified.

The American Refractories Institute was organized to serve all branches of industry, interested in the manufacture or use of refractories. The directors of the organization realized that this purpose could best be met through technical investigations and arranged to spend a major portion of the available funds on scientific work carried out by the research division of the refractories fellowship at Mellon Institute.

In former years it was the practice for the fellowship alone to determine the type of work that should be undertaken. Under the present arrangement the problems to be investigated and details of the various investigations are determined in conference with an advisory committee, composed of technical men chosen from the general membership.

New Tests and Specifications

In addition to investigations of the usual type, it has been decided by the committee that the fellowship will make a detailed study of the tests for refractories, and attempt to either make revisions or devise new tests which will give reliable information and data that can be used in specifications. This work has already been started, but it is clearly evident that years of experimentation will be necessary for its completion.

When the tests have reached the acceptable stage and complete information has been obtained as to the reaction of all available products in the tests, it will be possible to write specifications for those classes of service whose conditions are accurately known. It is felt that no more important service could be rendered to all industries interested in refractories than carrying out this kind of work and the cooperation of all concerned is earnestly solicited.

Publications of the Refractories Fellowship

- "Tests Now in Vogue for Refractories."—R. M. Howe, 1918.
- "Influence of Temperature upon the Action of Slag upon Refractory Materials."—R. M. Howe, 1918.
- "Year Imposes Severe Test on Refractories."—R. M. Howe, January, 1919.
- "Basic Refractories for the Open-Hearth."—R. M. Howe, February, 1919.
- "To What Temperature Must Fire Brick Burn?"—R. M. Howe, 1919.
- "Blast Furnace Refractories."—R. M. Howe, September, 1919.
- "Work of the Technical Division of the Refractory Manufacturers Association."—R. M. Howe, January, 1920.
- "Necessity for Care in the Preparation and Use of Fire Clay Mortar."—R. M. Howe, March, 1920.

"Things You Should Know About the Technical Department of the Refractory Manufacturers Association."—May, 1920.

"Blast Furnace Refractories."—R. M. Howe, July 30, 1920.

"Repressing of Hand-Made Fire Brick."—August, 1920.

"Vital Factors in the Testing of Fire Clay Refractories and in the Interpretation of Results."—R. M. Howe, October, 1920.

"Refractories for Electric Furnaces."—R. M. Howe, October, 1920.

"Refractories for Rotary Cement Kilns."—R. M. Howe, December, 1920.

"Additional Data on the Disintegration of Blast Furnace Refractories."—R. M. Howe, December, 1920.

"A Study of Spalling."—R. M. Howe and R. F. Ferguson, January, 1921.

"Magnesite Refractories."—J. Spotts McDowell and R. M. Howe, January, 1921.

"The Use of Plastic Clay Grog in Preventing Spalling."—R. M. Howe and S. M. Phelps, February, 1921.

"Modulus of Rupture of Silica Brick."—February, 1921.

"Tests of Fire Brick Made from Ganister, Flint Clay and Plastic Clay Mixtures with Special Reference to Spalling."—R. M. Howe and Mark Sheppard, March, 1921.

"Temperature Conversion Tables."—May, 1921.

"Important Information Regarding the Fusion Points of Orton Cones."—May, 1921.

"Composition and Properties of Diaspor, Bauxite and Gibbsite."—R. M. Howe and R. F. Ferguson, November, 1921.

"Effect of Weather upon the Strength of Refractory Brick."—R. M. Howe, S. M. Phelps and R. F. Ferguson, February, 1922.

"Influence of Grind and Burn on the Characteristics of Silica Brick."—R. M. Howe and W. R. Kerr, February, 1922.

"Fire Brick Markets in Latin America."—1922.

"Heat Transmission, with Special Reference to the Stoker Fired Boiler."—R. M. Howe and S. M. Phelps, July, 1922.

"Recent Developments in Refractories."—R. F. Ferguson, January, 1923.

"A Study of the Slag Test."—R. M. Howe, February, 1923.

"Use of Fresh Lump, Air-Slaked and Hydrated Lime in the Manufacture of Silica Brick."—R. M. Howe and S. M. Phelps, February, 1923.

"Heat Losses in the Burning of Clay Fire Brick."—R. M. Howe, March, 1923.

"Importance of Determining the Burning Characteristics of Refractory Clays."—M. C. Booze, July, 1923.

"Experiments Made to Determine the Value of the Patented Rebuffat Process for the Manufacture of Silica Brick."—M. C. Booze, July, 1923.

"Use of Pyrometers in Burning Fire Brick."—M. C. Booze, December, 1923.

"Checker Brick for Resisting Alkaline Slags."—M. C. Booze, January, 1924.

"Deformation under Load of Fire Clay Refractories."—M. C. Booze, July, 1924.

"Report of Tests on 'Faulkner's Bond'."—M. C. Booze, July, 1924.

"Effect of Grind and Burn upon Shrinkage and Weight of Fire Clay Mixtures."—M. C. Booze, July, 1924.

"Fire Clay Brick for the Open-Hearth."—M. C. Booze, September, 1924.

"Discussion on the Disintegration of Clay Refractories in Iron Blast Furnaces."—S. M. Phelps, September, 1924.

"Some Aspects of the Industrial Application of Refractories."—M. C. Booze, 1924.

"Report on Some Refractories Plants and Laboratories Visited in England, Scotland and Germany."—M. C. Booze, December, 1924.

"Common Sense and Common Refractories."—M. C. Booze, December, 1924.

"Effect of Red Hearts in Fire Clay Brick."—M. C. Booze, January, 1925.

"Clay Products."—M. C. Booze, February, 1925.

"A Study of the Factors Involved in the Spalling of Fire Clay Refractories with Some Notes on the Load and Reheating Tests and the Effect of Grind on Shrinkage."—M. C. Booze and S. M. Phelps, February, 1925.

"The Relation of Structure and Composition to Thermal Efficiency of Refractories When Used in Regenerators."—S. M. Phelps, April, 1925.

"The Chemical and Physical Properties of Fire Clays from Various Producing Districts."—M. C. Booze, October, 1925.

"Research Possibilities in Refractories."—M. C. Booze, 1925.

Note—Limited quantities of reprints of some of these articles are available and may be had by addressing the American Refractories Institute, 2202 Oliver Building, Pittsburgh.

Scrap in Blast Furnace Burdens

Lower Coke Consumption and Higher Output, Says
a German Investigator—Effect on
the Pig Iron

AN exhaustive discussion of the effect of scrap in the blast furnace charge is contained in two recent issues of *Stahl und Eisen* (Dec. 10, Dec. 17, 1925). It is by E. Bormann at Hoerde, Germany, and is taken from his doctor of engineering dissertation, presented at the University of Berlin.

Before the war the use of scrap in blast furnace charges was infrequent. During the war it was found necessary because of the lack of foreign ores, and in some plants it was carried so far that only enough ore

in scrap in the charge rising from 0 with No. 1 to 59.8 per cent in No. 5. Unfortunately it was not possible to have perfectly comparable conditions. The furnaces were different and operating under varying conditions. Test No. 1 was on basic Bessemer iron, the others on Bessemer iron. In the consideration of results the variables were harmonized as much as possible. Table II shows some of the results, taken from the complete heat balances.

The weight of charge per ton of pig iron steadily

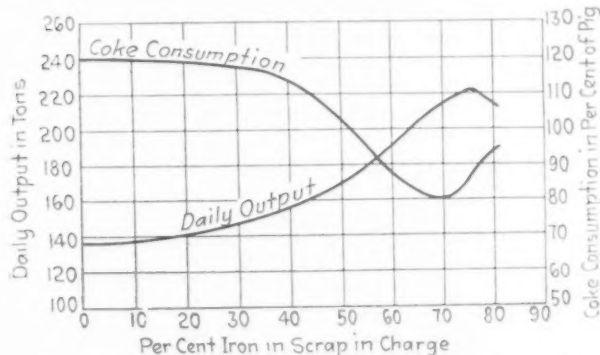


Fig. 1—Coke Consumption and Daily Output with Varying Charges

and flux was used to give slag volume sufficient for operation. This complete change in the character of the charge had a great influence on operating conditions and results. Above everything could be noticed a saving in fuel and a considerable increase in output.

When Making Bessemer Iron

In Table I are shown results obtained on a furnace under the same operating conditions, while making Bessemer iron.

Table I—Effect of Scrap While Making Bessemer Iron

Test	Iron		Coke, Consumption, Per Cent	Lime-stone, Used, Per Cent	Slag, Weight, Per Cent	Daily Output in Tons
	In the Charge Per Cent	in Scrap Per Cent				
1	100	00.0	120.0	50.0	n.d.	137
2	64.5	35.5	117.0	56.5	48.0	152
3	43.5	56.5	91.5	44.7	48.0	180
4	40.8	59.2	89.0	41.8	47.0	189
5	39.6	60.4	85.0	39.7	46.0	198
6	30.0	70.0	80.0	37.3	42.0	202
7	25.0	75.0	83.5	46.0	42.0	222
8	21.7	78.3	93.9	44.8	41.0	196
9	19.0	81.0	95.5	44.2	42.0	212

Test No. 1 shows the results with an ore charge used as a basis of comparison. Then follow charges containing varying amounts of scrap. The scrap was taken at 95 per cent iron in all cases. The coke and stone consumption and the slag weight are figured against the ton of pig iron. The results are strikingly shown in Fig. 1. The lowest coke consumption is shown when 70 per cent of the iron in the charge came from scrap. With more scrap than this it rises. The largest daily output was given with 75 per cent of the iron charge from scrap, an increase of 62 per cent compared with an all-ore charge. The figures in Table I, regarding slag volume, are also very interesting.

The next part of the paper gives carefully worked out heat-balances on five blast furnace runs, the iron

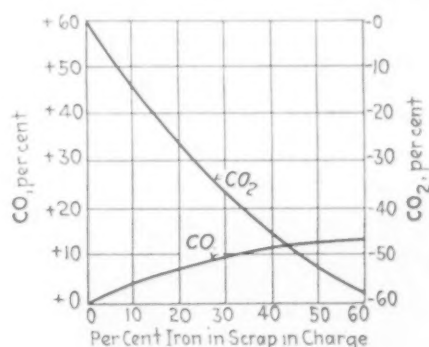


Fig. 2—Influence of Increasing Scrap Charges on the Carbon Monoxide and Carbon Dioxide in the Gases

dropped as the scrap increased, the total decrease of No. 5 compared to No. 1 being 33.5 per cent. The author discusses slag volume and reaches the conclusion that in no case should it be less than 40 per cent of the weight of the pig iron; that is, for each ton of pig iron the weight of the slag should not be less than 0.40 ton.

He next discusses the gases, shown diagrammatically in Fig. 2, where it is seen that the carbon-dioxide

Table II—Results from Heat-Balances on Five Furnaces

Test No.	1	2	3	4	5
Length of test in days..	7	6	6	6	6
Furnace capacity, cu. ft.	22,530	16,000	13,243	16,000	16,000
Hearth cross section, sq. ft.	1,636	1,033	872	1,033	1,033
Pig iron produced:					
Carbon, per cent.....	3.09	3.46	3.34	3.65	3.51
Manganese, per cent..	1.86	1.05	1.05	0.87	0.81
Silicon, per cent.....	0.23	2.15	2.02	2.29	2.95
Phosphorus, per cent..	2.67	0.112	0.112	0.106	0.104
Sulphur, per cent.....	0.10	0.03	0.03	0.02	0.026
Iron in ore in charge, per cent	100	65.4	64.6	42.3	40.2
Iron in scrap in charge, per cent	0	34.6	35.4	57.7	59.8
Iron in the scrap, per cent .....	...	94.0	92.5	96.0	96.0
Slag per ton pig, tons....	0.84	0.64	0.565	0.41	0.39
Gas analysis, vol. per cent:					
Carbon-dioxide	11.8	7.16	6.70	5.09	4.95
Carbon-monoxide	28.7	30.51	31.90	32.36	32.92
Hydrogen	2.8	5.41	5.31	3.96	4.0
Methane .....	...	0.20	0.18	0.43	0.33
Nitrogen	56.7	56.74	55.91	58.16	57.80

steadily decreases and the carbon-monoxide increases. With 60 per cent iron from scrap in the charge, the CO, in the gases has dropped 58.5 per cent from the highest value. The increase in CO naturally brings about an increase in heating value.

The author next discusses exhaustively the various

features of the heat balances and then passes to a careful consideration of gas samples taken from different parts of the furnace while carrying out Test No. 3 of Table II. The results are rather theoretical but of great interest.

Advantages and Disadvantages

The final conclusions are that the use of considerable scrap in the charge leads to changes in the furnace operation, particularly higher shaft and throat temperatures, decrease of indirect reduction and higher carbon-monoxide in the waste gases.

From the standpoint of economy, the use of scrap is beneficial. The coke consumption is lowered about 30 per cent and the increase in output reaches 60 per cent. This latter fact is naturally of great importance

in regard to cost of production. Further, the greater fuel value of the waste gases and the larger excess of energy thereby available is profitable.

The disadvantages are chiefly:

The difficulty of loading and handling the scrap, which brings about higher labor costs, particularly with light scrap such as turnings.

Greater loss of heat and use of cooling water, due to the higher shaft and throat temperatures.

Changes in the composition of the pig iron, due to non-uniform scrap.

Lower total carbon in the pig iron, which is, however, not particularly noticeable.

These disadvantages make the blast furnace operation more difficult, but seem to be outweighed by the advantages.

G. B. W.

Phosphides in Manganese Steel

Effect of High-Phosphorus Ferromanganese—Long Continued Annealing Recommended as a Cure

AN interesting article in a recent issue of *Stahl und Eisen* (July 2, 1925, page 1075) on "Phosphide in Manganese Steel," is contributed by E. Piwowarsky of the University of Aachen. He alludes to the importance of manganese steel and gives the usual chemical limits in Germany as carbon 0.90 to 1.30 per cent, manganese 10 to 14, phosphorus not over 0.08, sulphur not over

0.06, and silicon 0.20 to 0.40 per cent. There is usually no difficulty about meeting the sulphur requirement because the MnS, which is produced, slags off, but it is sometimes hard to keep the phosphorus down for the ferromanganese available frequently runs 0.30 per cent and over. The author examined a high-phosphorus steel which did not give satisfactory results. Its anal-



Fig. 1 (Left)—Steel as Cast, Etched with Picric Acid



Fig. 2 (Right)—Photomicrograph of Spot A in Fig. 1, Etched with Alkaline Sodium Picrate

Fig. 3—Same as Fig. 2, Etched with Neutral Sodium Picrate



Fig. 4—About the Same Location as Fig. 1 and Etched with Picric Acid



ysis was carbon 1.39, manganese 14.2 and phosphorus 0.13 per cent.

The structure of the steel, as cast, is shown in Fig. 1. In addition to the austenite (white) and the martensite needles, there may be seen a eutectic structure between the crystals. A similar appearance is sometimes found in ordinary manganese steel, but in this case the impression of a ternary or quaternary eutectic is strong and it may be presumed that free phosphide as well as free carbide is present. In order to test for this, selective etching was carried out by Matweieff's method for phosphoric pig irons, using both alkaline and neutral sodium picrate.

The results of etching part of the same area shown in Fig. 1 are given in Figs. 2 and 3, and in the original paper are also shown at higher magnifications. The presence of free phosphide as well as carbide is clearly

shown. It was assumed by this time that the free phosphide was the cause of the trouble. After annealing a small sample for 15 hr. in a vacuum at 1050 deg. C. (1920 deg. Fahr.) and quenching in cold water, the surprising result was reached that neither undissolved carbide or phosphide was left. The structure was homogeneous austenite as shown in Fig. 4.

This work was repeated with another sample of the same steel. Free phosphide was found again. After annealing this sample for 5 hr. at 1100 deg. C. (2010 deg. Fahr.) and quenching in water, phosphide and carbide had practically disappeared but fine inclusions were present at the grain boundaries.

The author's conclusions were that free phosphide might be present in high-phosphorus manganese steel but that, with long continued annealing, it would go in solution.

G. B. W.

Big Construction Year Forecast

Building Shortage Not Yet Overcome, Together with Normal Growth, Assures Outlay of Five Billions, Says Research Body

ALTHOUGH the building shortage in the United States has been largely overcome, there is no reason for a marked recession in building, according to the Copper and Brass Research Association, 25 Broadway, New York. For 1926 another year of great activity can be expected. Probably \$5,500,000,000 will be spent for new construction, repairs and replacements. Indications are that the next two years will see some \$10,000,000,000 spent on buildings.

During 1925 \$5,792,000,000 was spent for construction. For the third successive year, building in the United States exceeded \$5,000,000,000. Estimates prepared by the association show a total construction expenditure of over \$17,000,000,000 for the three years ended Dec. 31, 1925, as follows: 1923, \$5,923,000,000;

indication of receding from the present high figures it is apparent that our annual building program for some years to come will approximate \$5,000,000,000.

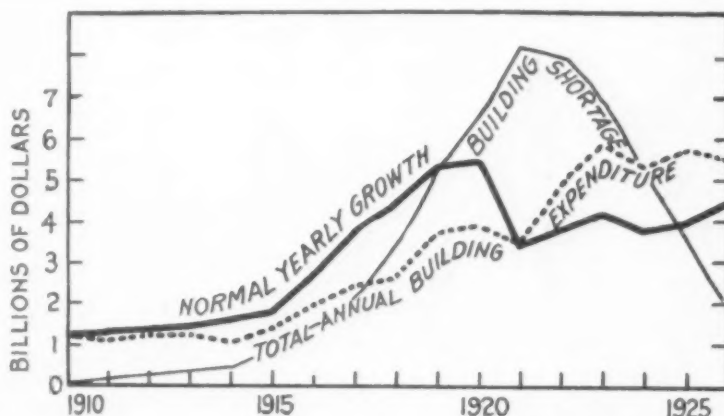
Present Yearly Requirements Five Billions

The annual requirements for the country, at its present state of prosperity, can be figured approximately as follows:

375,000 housings	\$2,500,000,000
Other construction	1,900,000,000
Depreciation, repairs, replacements, etc.	800,000,000
	\$5,200,000,000

Once the building shortage is overcome the annual needs will be almost identical with the normal growth.

TREND of Building in the United States, 1910 to 1925. Normal yearly growth represents the building requirements which accumulate annually because of increased population, and repairs and replacements. The normal growth line, being in terms of money, is necessarily affected by irregularities in the buying power of the dollar. The shortage of building at the beginning of each year, as shown in the curve, represents the difference between the total building requirements and the total building expenditures for the preceding year. It will be noted that the shortage built up during the war years has not been entirely wiped out.



1924, \$5,341,000,000; 1925, \$5,792,000,000; total, \$17,056,000,000.

The year 1925 almost equaled the record of 1923 when practically \$6,000,000,000 was spent to catch up with the shortage which the war years brought.

Normal Amount Placed at Over Four Billions

Careful study of all available data and estimates by others set the normal volume of the country's building at \$4,400,000,000. Of this amount \$2,500,000,000 are for some 375,000 new housings to meet increasing population demand. The remainder is for construction that follows as a logical step in the growth of cities and communities, such as schools, churches, stores, hospitals, theaters, etc.

The curves on the accompanying chart show the trend of construction for the past 15 years and give some index of future. As the building shortage is not entirely overcome and the normal growth shows no

The volume of requirements, as measured in money, will be affected by fluctuations in the value of the dollar, but at present values, an outlay of some five billions yearly seems assured.

Complaint Against Midland Steel Products Co. Dismissed

WASHINGTON, Feb. 16.—The Federal Trade Commission has announced dismissal of its complaint against the Midland Steel Products Co., Cleveland. The complaint had charged the company with lessening competition in the sale and distribution of automobile frames and frames parts by the acquisition of the capital stock of the Parish & Bingham Corporation, Cleveland, and the Detroit Pressed Steel Co., Detroit. Dismissal was ordered upon recommendation of the chief counsel of the commission.

Iron Ore Reserves for 110 Years

Lake Ores Given Less Than 40 Years—England
Has Supplies for Ten Centuries; Ger-
many, for One

BY OLIN R. KUHN†

MORE than 50 per cent of the world's production of iron ore and pig iron is contributed by the United States of America and our production is steadily increasing. This country also controls about 30 per cent of the world's known reserve of iron ore and 60 per cent of the potential reserve. Production of pig iron in the United States is more than four times that of any other country and is about equal to that of all the rest of the world.

In 1884 the production of pig iron in the United States was only about 4,000,000 tons. In 1923, forty years later, it was over 40,000,000 tons. The average yearly production for the 10 years, 1884 to 1893, was 6,810,000 tons, while the average from 1915 to 1924 was 33,100,000 tons. The production of iron ore has likewise increased from 27,500,000 tons in 1900 to a maximum of 75,300,000 tons in 1917. The average annual production of iron ore from 1915 to 1924 was about 60,000,000 tons, or nearly 50 per cent of the world's total, which was about 122,000,000 tons.

If the production of iron ore increases over the next 25 years at the same rate as over the last 25 years, by 1950 the United States will be producing over 100,000,000 tons of iron ore and 60,000,000 tons of pig iron annually.

Iron Ore and Pig Iron Production in the United States
(In Thousands of Gross Tons)

Calendar Year	Iron Ore Production	Iron Ore Imports	Iron Ore Exports	Available for Consumption	Pig Iron Production
1900.....	27,533	898	51	28,380	13,789
1901.....	28,887	967	65	29,789	15,878
1902.....	35,554	1,165	88	36,631	17,821
1903.....	35,019	980	81	35,918	18,009
1904.....	27,644	488	214	27,918	16,497
1905.....	42,526	846	208	43,164	22,992
1906.....	47,750	1,060	265	48,545	25,307
1907.....	51,721	1,229	279	52,671	25,781
1908.....	55,925	777	309	56,393	25,936
1909.....	51,155	1,695	456	52,194	25,795
1910.....	56,890	2,591	749	58,732	27,304
1911.....	43,877	1,812	768	44,921	23,650
1912.....	55,150	2,105	1,195	56,060	29,727
1913.....	61,980	2,595	1,042	63,533	30,966
1914.....	41,440	1,351	552	42,239	23,332
1915.....	55,526	1,341	708	56,059	29,916
1916.....	75,168	1,326	1,184	75,310	39,435
1917.....	75,289	972	1,132	75,129	38,621
1918.....	69,658	787	1,256	69,189	39,055
1919.....	60,466	476	997	59,945	31,015
1920.....	67,604	1,273	1,145	67,732	36,926
1921.....	29,283	316	440	29,159	16,688
1922.....	47,129	1,135	602	47,662	27,220
1923.....	69,351	2,768	1,117	71,002	40,361
1924.....	54,267	2,047	595	55,719	31,406

*High records.

†Donner Steel Co., Buffalo.

Practically all of the iron ore exported from the United States goes to Canada and the largest part of the imported ore comes from Cuba and Chile, from mines controlled by steel companies in the United States.

Iron Ores Imported into the United States
(In Gross Tons)

From	1912	1920	1924	1925
Cuba	1,398,593	889,852	285,288	535,130
Newfoundland	145,355			
Sweden	333,863	63,861	310,436	141,324
Chile			1,144,775	1,113,900
North Africa		193,829	192,814	173,070
Others	227,765	125,909	113,742	227,273
Total	2,105,576	1,273,451	2,047,055	2,190,697

*Includes 144,421 tons from Spain.

About 18 per cent of the world's known reserve of iron ore lies within the boundaries of the United States, but the ore controlled by the United States or companies located in the United States amounts to almost 30 per cent of the world's known reserve and 60 per cent of the potential reserve.

Iron Ore Reserves Controlled by the United States

	Actual Reserve	Potential Reserve
United States	10,447,000,000	84,872,000,000
Mexico (a)	150,000,000	
Panama	25,000,000	75,000,000
Cuba	3,159,000,000	12,000,000,000
Porto Rico	430,000,000	
Haiti, etc.	41,000,000	
Chile (a)	220,500,000	
Brazil (b)	1,400,000,000	
Philippines	805,500,000	
Total	16,678,000,000	96,947,000,000

(a) Assuming 50 per cent of the reserve controlled by the United States.

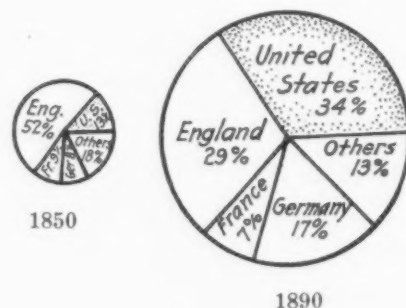
(b) Assuming 20 per cent of the reserve controlled by the United States.

Assuming that the reserve of the United States is 10,447,000,000 tons of iron ore and that the production increases as it has over the last 25 years, that is, about 1,500,000 tons per year, this reserve would be exhausted in 80 years. The 6,000,000,000 tons controlled outside of the United States would extend the life 30 years more, or until 2035. The potential reserve would last a little more than 200 years.

About 85 per cent of the production of iron ore in the United States is mined in the Lake Superior district. The reserve of this district is about 1,560,500,000 tons of assured ore and 1,068,700,000 tons of probable ore. M. C. Lake, geologist, estimates that the assured ore will be exhausted in about 20 years and less than 20 years more will consume the probable ore. The iron makers of Pittsburgh, Youngstown, Chicago and Buffalo

Pig Iron Production at Intervals, as Shown by Diagrams
(Thousands of Gross Tons)

	1850	1890	1900	1910	1923
United States	564	9,203	13,789	27,304	40,361
England	2,300	7,904	8,960	10,217	7,560
France	406	1,931	2,670	3,974	5,347
Germany	350	4,585	8,381	14,556	5,528
All others	781	3,372	6,382	9,422	7,703
Total	4,401	26,995	40,182	65,473	66,500



Pig Iron Production of the World, at Inter Per Cent of the Total in 1850 to 61 Per Cent

Iron Ore Production of Germany
(In Thousands of Tons)

Year	Germany	Lorraine	Luxemburg	Total	Import	Export	Available
1909.....	5,190	19,401	5,701	25,102	8,232	2,780	30,554
1910.....	5,708	16,386	6,163	28,257	9,659	2,905	35,011
1911.....	5,996	17,450	5,962	29,408	10,647	2,541	37,514
1912.....	7,035	19,728	6,429	33,192	11,925	2,273	42,844
1913.....	7,354	20,794	7,216	35,364	13,794	2,571	46,587
1914.....	6,360	13,815	4,927	25,103	b	b	.....
1915.....	6,843	10,582	6,041	23,466	b	b	.....
1916.....	7,917	13,073	6,644	27,634	b	b	.....
1917.....	8,738	13,395	4,208	26,312	b	b	.....
1918.....	7,788	a	a	7,788	b	b	.....
1919.....	6,055	a	a	6,055	b	b	.....
1920.....	6,259	a	a	6,259	6,347	158	12,448

a—Included in imports.
b—Figures not available for War years.

will then have to look elsewhere for their iron ore supply.

Germany Second Largest Iron Producer

Before the World War Germany, the second largest producer, averaged over 15,800,000 tons of pig iron and 30,300,000 tons of iron ore per year from 1909 to 1913. The importation of ores during this period amounted to about 8,000,000 tons annually. The loss of the Lorraine iron ore fields to France in the Treaty of Versailles has crippled the German iron industry, so that it will have to depend on imported iron ore to fill the bulk of its requirements. The pig iron production of Germany from 1920 to 1924 averaged only 8,300,000 tons per year, or about half what it formerly was. The domestic iron ore production is now from 6,000,000 to 8,000,000 tons annually. The iron ore reserves of Germany have been reduced from over 3,600,000,000 tons in 1913 to less than 1,300,000,000 tons at present. The production of pig iron in Germany will undoubtedly increase but it will be many years before she attains, if ever, her former place among the iron producers of the world.

Before the war the greatest part of the imported iron ore into Germany came from Sweden, France, Spain, Algeria and Russia, and since 1918 the ores have been coming from Sweden, Luxemburg, France, Norway, Spain and Newfoundland. During the last three years Germany has been getting from 300,000 to 500,000 tons annually from Newfoundland.

Iron Ores Imported Into Germany

From	1913	1920
British Isles.....	151,495	.....
Lorraine.....	.....	328,108
Austria.....	104,280	.....
Belgium.....	125,088	.....
France.....	3,749,641	873,088
Greece.....	144,783	.....
Netherlands.....	11,975	.....
Luxemburg.....	.....	1,319,136
Norway.....	.....	577,519
Russia.....	481,517	.....
Spain.....	3,573,686	589,431
Sweden.....	4,485,102	2,258,851
Algeria.....	473,424	.....
Tunis.....	134,220	.....
Others.....	358,528	400,620
Total.....	13,793,739	6,346,753

German iron ore reserves of 1,300,000,000 tons, assuming that the consumption averages from 10,000,000 to 15,000,000 tons annually, will be exhausted in about 100 years.

Pig Iron Production in Germany

1909.....	12,710,000	1918.....	11,565,000
1910.....	14,556,000	1919.....	7,038,000*
1911.....	15,285,000	1920.....	7,889,000*
1912.....	17,566,000	1921.....	8,786,000*
1913.....	18,999,000	1922.....	10,524,000*
1914.....	14,159,000	1923.....	5,528,000*
1915.....	11,600,000	1924.....	7,690,000*
1916.....	13,071,000	1925.....	10,047,000*†
1917.....	12,931,000		

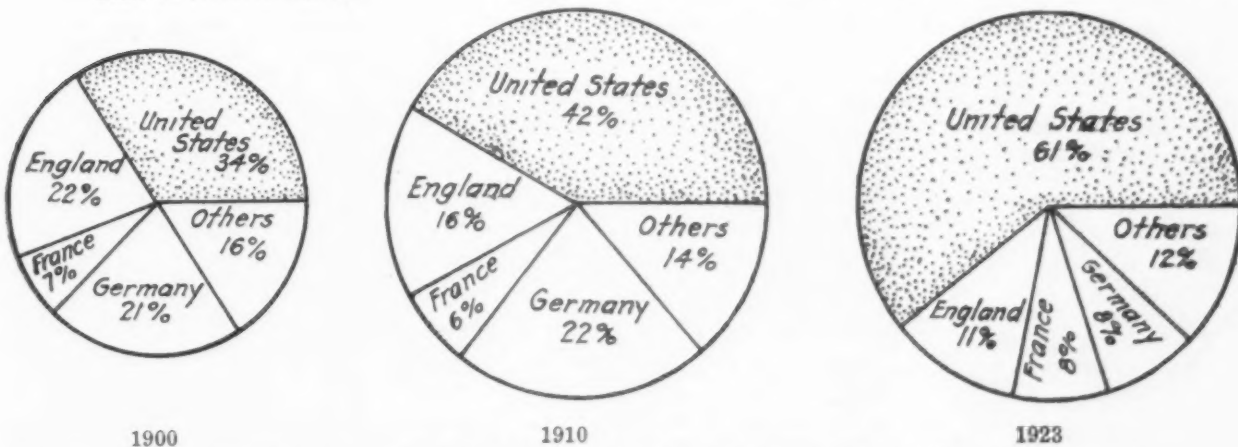
*Excludes Luxemburg and Lorraine.
†Partly estimated.

England has always been a constant producer of pig iron. Its output has varied generally from 7,000,000 to 10,000,000 tons annually. This amount has not increased over the last 40 years and, in all probability, England will continue at about the same rate. The average yearly production of pig iron in the British Isles from 1884 to 1893 was 7,511,500 tons and from 1915 to 1924 it averaged 7,566,000 tons. England formerly produced about 30 per cent of the world's pig iron production, but now makes only about 12 per cent. England produces from 12,000,000 to 15,000,000 tons of iron ore annually and imports from 6,000,000 to 7,000,000 tons.

Iron Ore and Pig Iron Production in Great Britain
(In Thousands of Tons)

Year	Iron Ore Production	Iron Ore Imports	Iron Ore Available	Pig Iron Production
1909.....	14,804	6,225	21,652	9,532
1910.....	15,226	6,848	22,778	10,217
1911.....	15,519	6,130	22,425	9,526
1912.....	13,790	6,439	20,990	8,751
1913.....	15,997	7,231	23,964	10,260
1914.....	14,868	5,539	21,086	8,924
1915.....	14,235	6,058	21,032	8,724
1916.....	13,494	6,852	21,060	8,919
1917.....	14,845	6,055	21,604	9,420
1918.....	14,613	6,458	21,752	9,107
1919.....	12,254	5,073	17,682	7,417
1920.....	12,707	6,419	19,624	8,035
1921.....	3,100	1,888	4,988	2,658
1922.....	6,120	3,472	9,592	4,902
1923.....	9,160	5,870	15,030	7,560

Imported ores into Great Britain are for the most part from Spain, but Algeria, Norway and Sweden are



vals During the Past Three-Quarters of a Century, Showing the Growth of the United States from 13 of an Immensely Larger Total in 1923. In the 73 years the American production was multiplied by 71½; that of the rest of the world by 7

large contributors. Great Britain exports very little iron ore.

Iron Ore Imports Into Great Britain, 1913

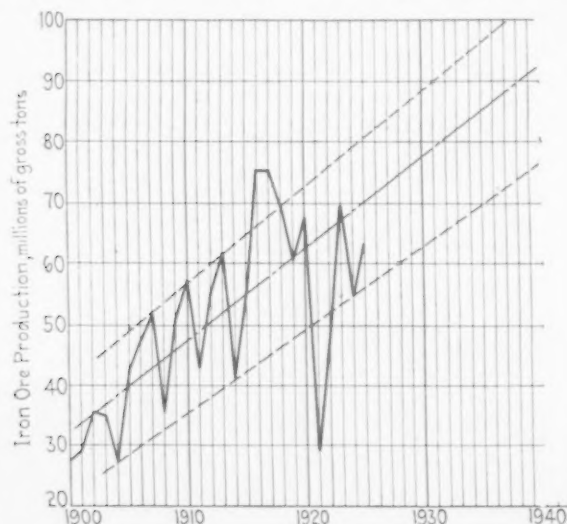
Spain	4,526,000	Tunis	279,000
Algeria	759,000	Greece	203,000
Norway	488,000	Newfoundland..	100,000
Sweden	367,000	Others	182,000
France	327,000		
		Total	7,231,000

Known iron ore reserves of Great Britain are estimated at about 5,893,000,000 tons, but the iron ore controlled by the British throughout her possessions amounts to about 16,582,000,000 tons of actual ore, or about the same as that controlled by the United States. The potential reserve controlled by Great Britain is about 60,836,000,000 tons. At the rate at which England is mining her iron ore at present, the reserve in the British Isles alone will last for more than 1000 years.

*Iron Ore Reserves Controlled by Great Britain
(In Gross Tons)*

	Actual Reserve	Potential Reserve
British Isles	5,893,000,000	5,844,000,000
Newfoundland	4,000,000,000	4,000,000,000
Canada	300,000,000	20,000,000,000
Brazil (a)	1,400,000,000	
West Africa	3,500,000	2,000,000,000
Union of South Africa	1,095,000,000	2,000,000,000
Rhodesia		6,000,000,000
India	3,326,000,000	20,500,000,000
Australia	470,000,000	492,000,000
New Zealand	69,500,000	
North Borneo	25,000,000	
Total	16,582,000,000	60,836,000,000

France, by the acquisition of Alsace-Lorraine, has greatly increased its iron ore reserves and pig iron capacity and the iron industry of France probably has the



Iron Ore Production of the United States for a Quarter Century Indicates a Trend as Shown, with Maximum and Minimum Figures of Normal Fluctuations Falling Pretty Generally Within the Upper and Lower Dotted Lines

greatest future of any of the countries in Europe. Prior to 1914 France was producing about 4,800,000 tons of pig iron annually and over 18,000,000 tons of iron ore, of which about 8,000,000 tons was exported. The production from 1920 to 1924 was about 5,000,000 tons of pig iron per year, but France is by no means

up to production and with the Lorraine fields should produce from 30,000,000 to 40,000,000 tons of iron ore annually, so that, in the future, France should rank next to the United States in the mining of iron ore.

*Iron Ore and Pig Iron Production of France
(In Thousands of Tons)*

Year	Iron Ore Production	Iron Ore Exports	Iron Ore Imports	Iron Ore Available	Pig Iron Production
1911.....	16,372	6,922	1,329	11,624	4,398
1912.....	18,852	8,190	1,431	12,093	4,860
1913.....	21,566	9,905	1,388	13,049 (x)	5,124
1914.....	11,071	4,751	690	7,010	2,692
1915.....	610	93	267	784	575
1916.....	1,654	73	618	2,199	1,270
1917.....	2,002	124	500	2,378	1,386
1918.....	1,645	67	117	1,695	1,272
1919.....	9,268 (a)	1,965	299	7,602	2,373
1920.....	13,648 (a)	4,337	397	9,708	3,379
1921.....	12,460 (a)	(b)	(b)	(b)	3,364
1922.....	18,600 (a)	(b)	(b)	(b)	5,147
1923.....	20,500 (a)	8,519	547	12,578	5,245
1924.....	28,992	11,000	673	18,665	7,535

(a) Includes Lorraine.

(b) Not available.

(x) Home production—11,662,000 tons; Algeria—52,000 tons; Germany and Luxemburg—794,000 tons; Spain—451,000 tons; Others—90,000 tons, total—13,049,000 tons.

France never had a large iron industry until 1911, but its pig iron capacity is now rated at about 11,000,000 tons annually. From 1901 to 1910 a total of only 16,523,000 tons of iron ore was mined in France, but it probably will not be long until France is producing double this amount yearly.

Production of Four Countries

The above four countries—United States, Germany, Great Britain and France—produce over 90 per cent of the world's iron ore and pig iron and control over 80 per cent of the world's iron ore reserves. In 1913 over 77,700,000 tons of pig iron was produced throughout the world. This figure has not been reached since. Average annual production of pig iron for the last 11 years has been about 63,000,000 tons per year. The world's capacity for pig iron has been given by the *Journal of Commerce* as follows:

	Tons	Per Cent
United States	52,700,000	53.4
Germany	12,000,000	12.2
Great Britain	12,000,000	12.2
France	11,000,000	11.1
Other Countries.....	11,000,000	11.1
Total	98,700,000	100.0

The above capacities show that the United States is capable of producing 53.4 per cent of the world's pig iron and the actual production of pig iron in the United States from 1915 to 1924 was 53.6 per cent of the total production of the world.

The iron ore capacity of the United States is practically unlimited, as many of the mines are open pit and the tonnage mined is limited to the requirements. While France has not as yet reached a production of 30,000,000 tons of iron ore annually, still it should not be long before this figure is reached.

*Figures given by THE IRON AGE, page 22, Jan. 7, 1926, differ somewhat from the above. Put into the same form, they are:

	Tons	Per Cent
United States.....	49,000,000	or 45.4
Germany	15,000,000	13.9
Great Britain	12,000,000	11.1
France	11,000,000	10.2
Other Countries	21,000,000	19.4
Total	108,000,000	100.0

Control of the World's Iron Industry

Country	Actual Iron Ore Controlled		*Potential Iron Ore Controlled		Pig Iron Capacity		Approximate Iron Ore Production	
	Million Tons	Per Cent	Million Tons	Per Cent	Thousand	Per Cent	Thousand	Per Cent
United States.....	16,678	29.0	95,947	57.0	52,700	53.4	63,000	51.0
Germany	2,827	5.0	2,843	1.5	12,000	12.2	8,000	7.0
Great Britain	16,582	29.0	60,836	36.6	12,000	12.2	12,000	10.0
France	9,780	17.0	4,090	2.5	11,000	11.1	30,000	24.0
All Others	11,474	20.0	4,051	3.0	11,000	11.1	10,000	8.0
Total	57,341	100.0	167,767	100.0	98,700	100.0	123,000	100.0

*Not considering an indefinite but large supply in Russia.

Cutting Down Waste on Castings

Reducing the Amount of Metal and Thus Minimizing
Machining Operations Now Successfully
Practiced in Many Plants

BY ALAN A. WOOD*

FOUNDRYMEN are very properly interested in cutting down their foundry losses to minimum. If they are casting such common article as frames for machinery it is quite essential that the casting will "clean up" when placed on the machine tool for subsequent operations. The question is, how much metal is it necessary to put on so that the casting may be finished properly.

Allowances on patterns in foundries were originally determined upon for a combination of several good reasons. Molten metal does not tend to flow and to congeal in perfect geometric forms and shapes. The laws governing its behavior are too complex for that. There have grown up a multitude of machine tools and devices to generate correct and useful planes, cylinders and combinations of various kinds. In our desire to machine planes or cylinders with truth and rapidity we have to a certain extent lost sight of the original object to be attained. Many metal-cutting machines are rated on their ability to remove stock. Is it not reasonable to believe that the real test of the tool should be its ability to generate the true cylinder or the true plane with a minimum of stock removal?

With the exception of the die casting process, which after all is mostly confined to small work, we do not know of any process of casting metal which will result in geometrically true planes or cylinders. Furthermore,

in most instances our processes of founding leave surfaces which are of a different texture and different physical and even chemical properties from the metal within. We later have to make provision for lubricating surfaces and obtaining finishes which are pleasing to the eye and which are not obtainable with the rough finish coming out of the mold. Therefore we come to the problem as to how much finish to add to the pattern.

Grinding Operation is Changing Practice

When lathes, planers, shapers and milling machines were the only standard machine shop tools this question meant that at the lowest point on the castings it was necessary to leave a 1/16-in. or 1/8-in. stock in order to make sure to get the steel tool below the hard scale. This meant that in some cases due to the warping of castings it was thought necessary to provide for as much as 1/2-in. or 3/4-in. excess metal. We have now come to the point in manufacture where the older types of machine tools carrying steel tools are being replaced more or less rapidly by a newer class of machines carrying grinding wheels as the cutting medium.

Nevertheless, in many foundries the old pattern tolerances still remain in spite of the change in machine shop methods during the last 10 years or so. Five years ago I saw at the plant of the Bethlehem Steel Co. many steel castings carrying in places at least 3/8-in. excess stock, which I was then assured was absolutely

*From a paper read before the Philadelphia Foundrymen's Association.

This casting (at right) for a recording machine was at first made in one piece, entailing large losses in the foundry; then the casting was cut down at the base and made in two pieces instead of one, being drilled and bolted together by inside flanges. A further saving was effected by cutting the main body of the casting in half and flanging it together; in this way it could be made on a molding machine

This casting (below) of a large gear housing was at first machined on a planer, taking about 4 hr. to remove about 3/8-in. stock; subsequently it was done on a grinder in 1 1/4 hr., but with only 1/8-in. finish instead of 3/8-in. this time could be cut to 3/4 hr.



necessary in order to keep losses within reasonable limits. Recently I was informed in the same plant that by special methods they had succeeded in cutting these finishes down to 1/16 in. or 1/8 in. The saving in manganese steel means something expressed in terms of 12c. a lb.

Take the case of a rectangular cast iron block about 4 in. wide by 36 in. long by 5/8 in. high. We figured the weight of this block on the slide as 22 lb. Then consider another block of the same dimensions, which instead of being 5/8 in. high is 1/8 in. high and weighed 4.4 lb. In other words, if we had a casting of the dimensions given with 5/8 in. stock left as finish and cut this finish down to 1/8 in. stock we would save 17.8 lb. of gray iron. Let us suppose that we are buying our castings at the rate of 6c. per lb. and then the savings in dollars and cents by cutting down the pattern would be \$1.06 per piece.

We all know that castings made from old patterns have a tendency to grow as the age of the pattern increases. In our own plant we find that a line of cast iron columns tends to increase in weight about 10 per cent per year, which we can only account for by the patterns becoming old and therefore being handled a little more carelessly in the rapping than new patterns. We therefore go over our patterns once a year to determine where finish can be reduced.

Excess Finish An Economic Waste

It is our belief that the excess finish which is found on many castings today is a case of pure economic waste in industry which could and should be avoided. This may mean the adoption of more careful methods of molding in the foundry, the greater use of chill molds, and some changes in rigging or equipment. Such changes may result in a slightly increased cost of making castings, but if the cost of molding is slightly increased the cost of machining is decreased. In other words, why put it on in the foundry and take it off again in the machine shop?

Thus far we have spoken of the saving in metal alone, but the modern foundryman is also concerned in the subsequent operations after the castings leave the foundry. We might mention a casting of a large gear housing made in a Philadelphia foundry recently. This casting had previously been machined on a planer, taking approximately 4 hr. for the operation to remove about 3/8 in. of stock. The casting was placed on the bed of a grinding machine in which the cutting is done by a sectional abrasive wheel instead of by steel cutting tools. This wheel is made up of segments or bricks quite similar in appearance to the rubbing bricks with which we are so familiar in the foundry. The wheel covers the entire width of the work and the action of the wheel on the hard skin of the casting is practically the same as on the softer metal below. Even with the 3/8-in. stock the time of grinding as against 4 hr. for planing is 1 1/4 hr., therefore effecting a saving of two-thirds of the time, but if it should be possible to eliminate all but 1/8 in. of the finish this time could be cut down to 3/4 hr. as against 4 hr. on the planer.

Large Saving Effected in Camden Plant*

Warren Webster & Co., Camden, N. J., manufacture a well known line of steam traps and other specialties. The company buys its castings, which are comparatively small and of medium size, and these castings are fine examples of the foundryman's art, and although the work was originally designed for machining with cutting tools, only 1/8 to 1/4-in. stock has been left to be removed. These patterns are being changed over as rapidly as possible to allow a minimum of finish of 1/32 to 1/16 in. This is all molding machine work and some of it is made on plates or boards. By figuring out a saving of 1/8 in. of surface, the company is able to effect a reduction of 146,119 cu. in. or approximately 38,527 lb. on an average year's production. Figuring metal at 6c. a lb., this amounts to \$2,311.62 per year. This not only pays for the grinding wheels to generate these plain surfaces but also covers nearly all of the expense of the operator's time. In other words, by cutting down on stock the company has been able to get the surfaces machined free.

Some of our friends who are good at bookkeeping and who own or control their own foundries in conjunction with machine shops argue that the excess stock of castings does not cost 6c. a lb., but costs a very small amount additional for that stock, say only 1 1/2 c. per lb. to cover the bare molding cost. I would suggest that these manufacturers go into the open market to buy their castings on this basis. Let them first order a lot of castings with 1/8-in. finish and let them then add 1/4 in. or 3/8 in. to their patterns; will the foundry charge them 6c. a lb. for the excess metal or only 1 1/2 c. a lb.? In other words, the value of this excess metal is what it will bring in the open market and not what it costs to mold.

There are other ways of cutting down patterns. Take the case of a certain piece with a broad, unrelieved surface which was later relieved at the center so that the actual surface area to be finished was much less than in the first case. Immediately we say that there is a slight increase in molding cost, which is true. Consider now the time spent in subsequent operations. In the case of the first surface this may be machined on a grinder in 20 min.; in the case of the second surface this may be machined on a grinder in 12 1/2 min.—a saving per piece of 7 1/2 min. The power requirements at maximum are diminished to about one-half and the normal requirements to even less than this.

How One Loss Was Eliminated

An illustration shows a very disagreeable job for the foundry in an L-shaped casting. This troubled us considerably and ran our losses away over what we considered a reasonable figure. Our foundrymen cut the casting down at the base, made two separate pieces of it, had the machine shop foreman grind the two bases, drill and bolt together by inside flanges, and has cut down losses almost to nothing; and he got the job done more cheaply in two pieces than in one. But he went further, and by cutting the main body of the casting in half and flanging it together he has put it on a molding machine and has diminished his losses still further.

If the foundryman is willing to go to the trouble of conforming his practice to the comparatively new art of grinding he can effect these savings.

Electrothermic Metallurgy of Zinc

A study of the electrothermic distillation of zinc ores is being conducted by the United States Bureau of Mines, with the purpose of perfecting a process that will be suitable to conditions in the United States, in order that zinc ores may be smelted more efficiently and cheaply than by the present retort process, and that complex ores, which cannot be worked profitably by present processes, may be treated economically. The development of an electrothermic dry distillation zinc furnace, which uses small zinc ore briquets in bulk as a resistor instead of a built up resistor of large briquets, has been brought to a conclusion, so far as it could be with a small laboratory furnace holding a charge of about 100 lb. of briquets, with satisfactory results. Further development of this type of furnace will depend upon the installation of a larger furnace. A complete experimental dry distillation zinc smelting plant, using the Fulton process, is nearing completion. This plant will include the necessary crushing equipment for crushing ore and coke, a hydraulic press for making the briquets, a baking oven for baking new briquets by means of the waste heat in the distilled briquets, and a 3-unit distillation plant with central condenser. The plant will have a capacity of several hundred pounds of zinc per day.

At the February meeting of the St. Louis chapter of the American Society for Steel Treating, Friday evening, Feb. 19, George A. Richardson, manager publicity department, Bethlehem Steel Co., Bethlehem, Pa., will deliver a lecture on "The Manufacture of Tool and Alloy Steel," illustrated with five reels of new moving pictures.

NEW FORGING MACHINE

Improved Features Claimed to Permit of Higher Production and Wider Range

High speed, quick starting, stiffness of bed frame and accuracy of alinement are features claimed for the forging machine here illustrated, which is being marketed by the National Machinery Co., Tiffin, Ohio. These features are stressed as extending the usefulness of the machine, improving the quality of the product, and making for long life of the dies employed.

Several improvements have been incorporated in the new design, and the capacity, weight and speed have been increased, so that the machines are now rated as of high duty type. Essential features retained from

slide shown in Figs. 2 and 3 is said to guide the heading tools with such accuracy and freedom from side movement that more unsupported stock can be gathered in one blow than heretofore. The grip slide has been provided with an extended under-arm, shown in Fig. 3, to prevent both sagging and rocking of the slide. By maintaining uniformity of grip slide alinement, the grip dies can grip the work throughout their entire length, thus preventing the work from slipping. It is claimed that this improvement in alinement has markedly increased the quality of the forgings produced, and permits the machine forging of much work formerly made by other and more expensive methods.

From Fig. 3 it will also be noted that the customary knuckle block at the front end of the heading crank pitman has been replaced by two bronze bushed bearings in the cheeks of the heading slide, which operate

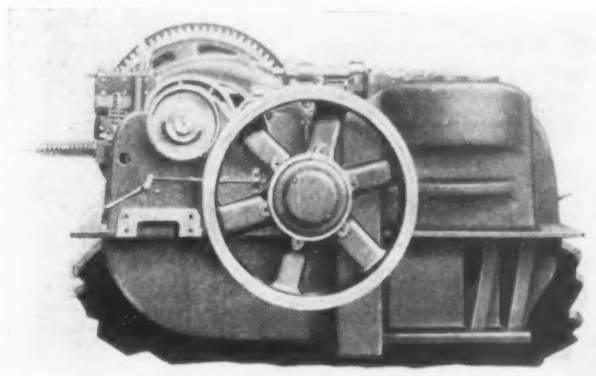


Fig. 1—High-Duty Forging Machine, Flywheel Side. Compactness is made possible by the adoption of an over-arm type heading slide

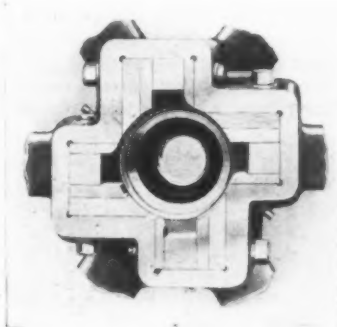


Fig. 4 (Left)—Quadruple Abutment Starting Clutch, Which Causes the Machine to Start In One Quarter of a Revolution

Fig. 5 (Right)—Crankshaft Hub Showing Seat for Clutch Pin. The latter is of rectangular section having large bearing area



Fig. 2—High Accuracy of Heading Tool Alinement Is Provided by Redesign of Heading Slide

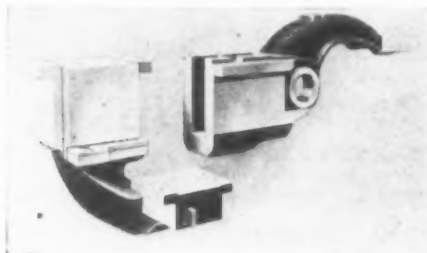
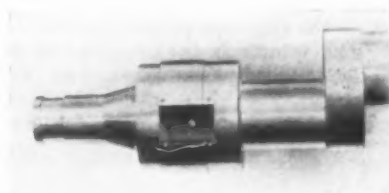


Fig. 3—The Grip Slide Has Been Provided With an Extended Under-Arm to Prevent Sagging and Rocking of Slide



the company's previous design include the short and compact underslung bed frame; suspended-type heading and gripping slides; patented automatic grip relief; wedge-type liner adjustments for the heading and gripping slides; and the friction-slip fly wheel.

The bed frames have been increased in depth and weight and are of heavy C-clamp form. This construction is stressed as imparting a degree of rigidity which prevents springing open of the bed frame, thereby eliminating swollen shanks and excessive fins on the forgings. The rigidity of the bed frame is also claimed to prevent slipping of the work through the dies and to practically eliminate the necessity for back stops. Tie rods are not employed.

The compactness of the new bed frame, which may be noted from Fig. 1, is said to have been made possible by the adoption of an over-arm heading slide of new type (patented), which has only part of its necessary length at the customary location ahead of the crankshaft. This permits of material reduction in the length of bed. Another improvement is the redesign of the heading and gripping slides. These have been provided with an over-arm or extended bearings to increase the accuracy of the slide alinement. The over-arm heading

in connection with a large round pin gripped in the front of the heading pitman. This arrangement has increased the bearing area and eliminates trouble caused by scale and dirt getting into the knuckle bearing.

Increase in the depth of the die space is another improved feature. This increase has been made entirely below the center line passing through the crankshaft and permits the use of higher dies than heretofore, without any tendency for the heading slide to raise out of its bearings. The length of the present heading slide enables the downward pressure from the heading crank pitman to hold the front end of the slide in a down position, thereby resisting any tendency for the slide to raise when the work is above the center line. The machines are equipped with the company's suspended-type heading and grip slide bearings. The bearings are above the path of scale and water and they have wedge adjustment at the side of the slides, so that by removing the top cap any side play can be taken up without removing the slides from the machine.

The new quadruple abutment starting clutch, shown in Fig. 4, has been incorporated in the new machine. This clutch causes the machine to start in one-quarter

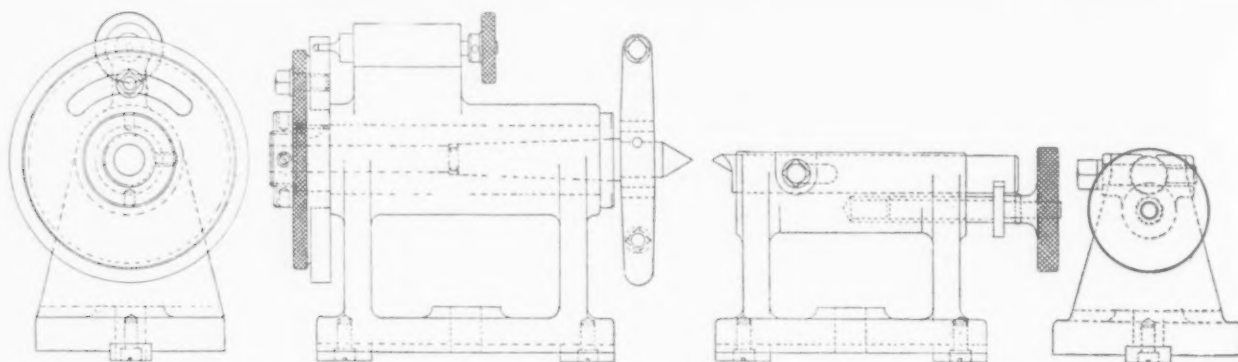
of a revolution, and, in providing practically instantaneous starting, is stressed as increasing the output of the machine. The clutch mechanism has also been improved, the clutch pin now being a large rectangular member having large bearing area. It travels in a pocket in the hub of the crankshaft, shown in Fig. 5, and engages the hardened clutch abutment blocks in the main gear, which in turn are backed by laminations to cushion the starting movement and eliminate wear.

The machines are available in five sizes, 2 in., 3 in., 4 in., 5 in. and 7½ in. They may be supplied for either belt or direct geared motor drive, using the friction-slip flywheel as a safeguard to the motor.

Adjustable Dial Index Center

The adjustable dial index center here illustrated is intended primarily for holding taps or reamers to be ground on contour of flutes or cutting faces, radial or non-radial, with center. The device, which is being placed on the market by John B. Stevens, Inc., 27 Cleveland Place, New York, can be used either at right or left hand on grinding and milling machine tables.

The work may be held either between centers or in a



Adjustable Dial Index Center for Holding Taps or Reamers to Be Ground. It may be used either at right or left hand

chuck mounted on and driven by a taper shank. After setting the work to conform with latch pin hole setting in the dial, the head stock spindle can be turned to bring the edge, face or contour of the work to be ground, to the required position in relation to the emery wheel. The spindle is then locked for the various positions to be indexed. The tongues as regularly supplied are for ¼-in. Tee slots, although ⅝-in. tongues can be furnished if desired. Male centers with dogging center in the headstock are part of the regular equipment.

Rate of Reduction of Iron Oxides

The object of a study of the rate of reduction of iron oxides, being conducted by the United States Bureau of Mines, is to obtain results of use in the design and operation of the blast furnace. Although the methods of physical chemistry are employed in the experiments, the possibility of applying the results to practical furnace problems is kept in the foreground. Experiments during the past year have shown what are the important temperatures, rates of flow, sizes of particles and apparent densities of ore mass. The percentage of voids between the ore particles was found to affect the reaction rate. The degree of oxidation of the ore also has been found to be of great importance. The reduction rate has been followed from analyses of the gas flowing into and out of the heated ore beds, and by the composition of the ore after each test. A third method for measuring reduction, involving a determination of the magnetic susceptibility of the ore, is being developed.

One of the blast furnaces of the American Rolling Mill Co., at Ashland, Ky., was blown out on Feb. 15.

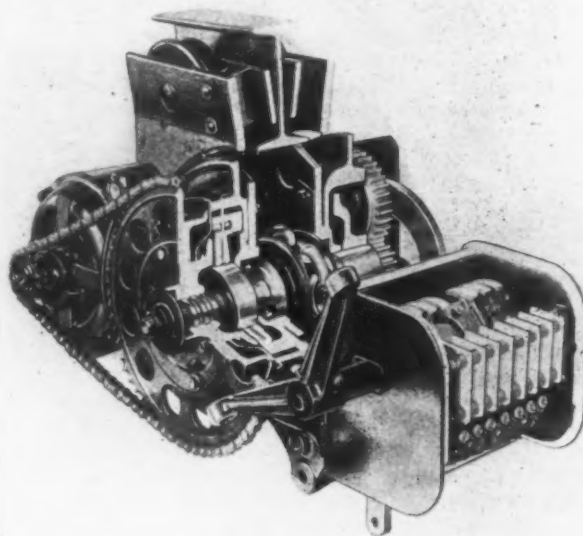
Ball-Bearing Electric Chain Hoist

Close head-room, long lift, and high speed are among the features claimed for the ball-bearing electric chain hoist here illustrated, which has been placed on the market by the Yale & Towne Mfg. Co., Stamford, Conn.

The hoist is designated as the model 20B and is available in four sizes with rated capacities of ¼, ½, 1 and 2 tons, respectively. Suspension members are of steel, and automatic top and bottom limit stops are provided. The machine may be adapted conveniently to any overhead system, the side plates of the trolley carriage being arranged so that they can be spaced on steel bars to fit the beam flange.

Centralized suspension is stressed as providing a balanced load on the trolley wheels and hoisting unit, irrespective of load position. The mechanism is fully inclosed in oil-tight chambers, is compact and may be inspected conveniently. The ball-bearing load sheave employed is claimed to make for low current consumption and general hoisting efficiency. The load sheave is of steel, and is of heavy one-piece construction. It is ground on an arbor to assure concentricity with the ball races, and is bronze-bushed for the driving pinion.

All gears, pinions and bearings are lubricated by the splash system. The driving pinion that passes through the load sheave is machined from a single drop forging,



Electric Chain Hoist. All suspension members are of steel and the mechanism is fully inclosed in oil-tight chambers

then heat-treated. The bearing surfaces on the shaft are ground to 0.001 in.

Electrically-welded steel chain can be furnished for lifts of various lengths, and steel chain containers holding slack chain of any length up to 60 ft., for ¼, ½ and 1-ton hoists and up to 30 ft., for the 2-ton hoist, are available. These containers are secured to the under frame of the hoist and do not affect the head-room.

British Shipyards Better Filled

Contracts for Motor Driven Ships—German Export Sales Larger
—French Production Costs Rise

(By Cable)

LONDON, ENGLAND, Feb. 15.

PIG iron is quieter after the recent activity, but prices continue firm and prompt supplies are scarce. Bolckow, Vaughan & Co. have blown in one furnace on ferromanganese and Dorman, Long & Co. are blowing in a furnace on foundry. Export demand for foundry and forge iron is still small, but good sales of hematite continue to both domestic and foreign consumers. Foreign ore is quiet with Bilbao Rubio at 21s. 3d. to 21s. 6d., c.i.f. Tees.

While there is moderate inquiry for finished steel, business is confined to isolated purchases. Shipbuilding is improving. William Beardmore & Co., Ltd., Glasgow, are building three large motor-driven ships for South America. The Furness Shipbuilding Co., Ltd., has secured contracts for two 10,000-ton motor-driven liners from the United States. Swan, Hunter & Wigham Richardson, Ltd., has secured orders for three 8000-ton motor-driven liners from Australasia.

January exports of pig iron totaled 43,255 gross tons, of which the United States took 19,825 tons. The total of iron and steel exports for January was 336,664 gross tons.

Tin plate is quiet, with only moderate demand and easier prices. Sales have been made down to 19s. 1½d. per base box, f.o.b. work's port. While the pooling arrangement is operating there is no actual restriction on output as yet. Galvanized sheets are moderately active and mills are better employed. Exports of sheets were again heavy in January, totaling 68,209 tons. Japanese demand for black sheets has been dull, with only a few small sales, and other markets are also quiet.

Continental markets are quiet, but prices are generally firm. Buyers are not keen to enter forward contracts as lower prices are anticipated when Charleroi plants attain normal activity, which is expected to be about the end of this month, as negotiations are still proceeding with some of the strikers. There is the possibility of a railroad strike in Lorraine in the near future. There were 37 Luxemburg furnaces in blast

Dec. 31, compared with 34 one year ago. German mills are suggesting joint control over European sales in foreign markets.

Luxemburg Prices Firm

Mills Well Booked with Export Tonnage and Maintaining Prices Higher Than Competitors

LUXEMBURG, Jan. 27.—As a result of the decline of the French franc which helped to fill French mills with plenty of export business and the continuation of the strike in the Charleroi district, now settled, Luxemburg mills booked heavily in December and have been in a satisfactory position during January. In consequence, prices have exhibited a tendency to rise in the second half of the month, although in general Luxemburg prices are higher than the quotations of Belgian and French sellers. Demand for rails and accessories has been particularly good. A good volume of business is also reported in hoops, wire rods and steel bars, but the market on structural material is still low. While but little business has been done with German consumers numerous sales are reported to British and overseas markets. Although the settlement of the Charleroi district strike is returning considerable capacity to production, it is not believed that this will greatly affect prices.

The pig iron market is strong, with prices ranging from 330 to 340 fr. per metric ton, f.o.b. Antwerp, on foundry iron. Very little semi-finished material is available, although prices on blooms are somewhat weak. Billets and sheet bars, however, continue strong at £4 10s. (\$21.87) per metric ton for billets and £4 15s. 4d. (\$23.10) per ton for sheet bars, f.o.b. Antwerp. Active competition for bar business has developed between Luxemburg and Lorraine mills, but quotations have not been affected. Luxemburg mills quote beams at £4 18s. to £4 19s. (\$23.80 to \$24.05), bars at £5 6s.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £, as follows:

Durham coke, del'd..	£1 1s.	\$5.10
Bilbao Rubio ore†	1 1½	5.22
Cleveland No. 1 fdy.	3 12½ and £3 13s.	17.62 and \$17.74*
Cleveland No. 3 fdy.	3 10 and 3 10½	17.01 and 17.13*
Cleveland No. 4 fdy.	3 9 and 3 9½	16.77 and 16.88*
Cleveland No. 4 forge	3 8 and 3 8½	16.52 and 16.65*
Cleveland basic	3 10 and 3 10½	17.01 and 17.13*
East Coast mixed	3 17 to 4 0	18.71 to 19.44
East Coast hematite..	4 19	24.06
Ferromanganese	15 10	75.33
*Ferromanganese	15 5	74.12
Rails, 60 lb. and up.	7 5 to 8 0	35.24 to 38.88
Billets	6 0 to 7 10	29.16 to 36.45
Sheet and tin plate bars, Welsh	6 5	30.38
Tin plates, base box.	0 19¼ to 0 19¾	4.68 to 4.80
C. per Lb.		
Ship plates	7 2½ to 7 12½	1.54 to 1.65
Boiler plates	11 0 to 11 10	2.39 to 2.49
Tees	7 7½ to 7 17½	1.47 to 1.71
Channels	6 12½ to 7 2½	1.44 to 1.55
Beams	6 7½ to 6 17½	1.40 to 1.50
Round bars, ¾ to 3 in.	7 17½ to 8 7½	1.71 to 1.81
Steel hoops	10 10 and 11 0*	2.28 and 2.49*
Black sheets, 24 gage	11 5 to 11 10	2.35 to 2.49
Black sheets, Japanese specifications	14 15	3.19
Galv. sheets, 24 gage.	16 0 to 16 5	3.47 to 3.52
Cold rolled steel strip, 20 gage	18 0	3.91

*Export price.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

Foundry pig iron:(a)				
Belgium	£3 2s.	to £3 4s.	\$15.06	to \$15.55
France	3 2	to 3 4	15.06	to 15.55
Luxemburg	3 2	to 3 4	15.06	to 15.55
Basic pig iron:(a)				
Belgium	3 0	to 3 2	14.58	to 15.06
France	3 0	to 3 2	14.58	to 15.06
Luxemburg	3 0	to 3 2	14.58	to 15.06
Coke	0 18		4.37	
Billets:				
Belgium (Nom.)	4 15	to 4 16	23.08	to 23.33
France (Nom.)	4 15	to 4 16	23.08	to 23.33
Merchant bars:				
Belgium	5 8½	to 5 10	1.19	to 1.21
Luxemburg	5 8½	to 5 10	1.19	to 1.21
France	5 8½	to 5 10	1.19	to 1.21
Joists (beams):				
Belgium	5 0	to 5 5	1.10	to 1.15
Luxemburg	5 0	to 5 5	1.10	to 1.15
France	5 0	to 5 5	1.10	to 1.15
Angles:				
Belgium	5 2	to 5 4	1.12	to 1.15
¼-in. plates:				
Belgium	5 19	to 6 3	1.31	to 1.34
Germany	6 2½	to 6 5	1.35	to 1.36
¾-in. ship plates:				
Belgium	5 11	to 5 12½	1.21	to 1.23
Luxemburg	5 11	to 5 12½	1.21	to 1.22
Sheets, heavy:				
Belgium	6 3	to 6 4	1.36	to 1.37
Germany	6 3	to 6 4	1.36	to 1.37

(a) Nominal.

to £6 5s. 7d. (\$26.75 to \$30.50), wire rods at £5 16s. (\$28.20) and medium sheets at £5 19s. to £5 19s. 6d. (\$28.92 to \$29.04), all f.o.b. Antwerp.

On Dec. 31 there were 37 furnaces in blast in Luxemburg. The December pig iron production totaled 199,575 metric tons and steel production totaled 176,130 metric tons. The total production of pig iron in 1925 was 2,344,043 metric tons and the total output of steel was 2,084,268 metric tons.

German Export Better

Success in Steel Merger Produces Optimism— Domestic Buying Light

BERLIN, GERMANY, Jan. 29.—Success in the formation of the Western Steel Trust is fostering optimistic sentiment, not particularly justified by business conditions, although increased activity in the scrap market and larger export demand are taken in some quarters to foreshadow a general revival of business.

Various minor questions not determined when the steel trust was formed are being settled. Recently it was definitely decided that the large coal interests of the Rhenische Stahlwerke Corporation, which are allied with the new Dyes and Nitro Trust, should not be included in the steel trust. The ultimate capital stock of the new corporation has been set at 700,000,000 m. in addition to which there will be 1,200,000 m. of limited participation stock. The Siemens electric interests, which are the Siemens & Halske A. G., Siemens A. G. and the Siemens-Schuckert-Werke G.m.b.H., are not included in the new trust, but will retain some connection. In the meantime a merger of the electrical manufacturers of Germany is being considered.

According to a recent statement August Thyssen & Co. will bring into the new corporation the Gewerkschaft Friedrich Thyssen, the August Thyssen Hütte, the Maschinenfabrik Thyssen of Muelheim and the August Thyssen Trading Corporation. The Rhine-Elbe Union will bring in the mining and iron and steel works of the Gelsenkirchen Bergwerks and the Deutsch-Luxemburgische Bergwerks und Hütten A. G., with the exception of certain mines. Otto Wolff & Co. will bring in the Phoenix A. G. and the Vereinigte Stahlwerken Van der Zypen und Wissener A. G., omitting certain lignite mines of the latter company. The Rhenische Stahlwerke brings in its iron and steel works and ore, lime, dolomite, clay and quartzite mines.

Negotiations for entry of the Saar Steel works into the German Raw Steel Syndicate have been unsuccessful as the Saar producers, while agreeing to control of their production rate on shipments into Germany refuse to accept the Raw Steel Syndicate's control on their export production. Negotiations are being continued toward conversion of the Rivet Price Convention into a syndicate. The German-Czechoslovakian Tube Cartel has reached an agreement with French and Belgian tube mills for regulation of selling prices and establishment of competitive areas. Thus far the agreement does not extend to gas or boiler tubes. In Brussels, German and Belgian wire makers are negotiating for an agreement on world-market policy. Establishment of a Wire Cable Syndicate is retarded by some manufacturers, who are under long term contracts, the conditions of which would not be in accord with the regulations of the syndicate.

Export Trade Improves

Domestic prices of the Pig Iron and Raw Steel syndicates continue unchanged for February. There is an improved demand for iron and steel scrap, particularly for blast furnace grades. The Steel syndicate reports a better foreign demand which may be maintained as French and Belgian mills are unable to offer early deliveries on many products and in general show less interest in export orders. A particular increase in inquiries for light gage sheets is noted. Export inquiry for wire, especially barbed wire, is considerably better and there is an improved demand for steel bars for export. Negotiations for rails and other material are

under way with several South American and Scandinavian railroads.

While domestic inquiry for semi-finished materials continues light, the export market is more active, possibly as a result of further price reductions offered on condition of prompt payment. In the Siegerland district the ore mines and rolling mills report depression. Demand for structural steel is small, but improvement in the building trades may indicate greater activity in the near future. While shipbuilding has increased recently sales of boiler tubes are still small.

Although official syndicate prices are unchanged, considerable selling is being done at less than the official schedule. The difference between German domestic prices and world market prices as determined each month by the Steel syndicate for the purpose of granting rebates, has not changed. These world market prices determined by the syndicate for February are as follows, per metric ton:

	World Market Marks	Domestic Marks
Ingots	90	104.25
Blooms	92	111.75
Billets	95	119.25
Shapes	100	131.25
Bars	106	134.30
Wire rods	115	140.00
Sheets (under 1 mm.)	155	180.00

There is increasing complaint by German sellers of French and Belgian "exchange dumping" and it is of some interest in this connection that the French Chambre Syndicale des Industries Metallurgiques has issued a warning against dumping. "French export prices," it says, "should be at the real world-market price, which is not the price resulting from the low French exchange." Further, the syndicate points out prices should be fixed in gold. Chancellor Luther, in a speech before the Reichstag this week, advocated special measures against "exchange dumping" and the importation of British "subsidized" coal.

Export of railroad permanent way material has increased. An order for 10,500 tons of steel rails has been booked for the Finnish State railroads. Reparations orders for railroad material, with the exception of some large Serbian purchases, have been small. German railroad finance has been unsatisfactory and the latest reparations bonds interest was paid out of reserve. The machine tool industry is operating only about 40 per cent and the Machinery Manufacturers' Union recently reported that about 25 per cent of the makers were operating 24 to 40 hours a week.

The Maschinfabrik Buckau has booked a 2,000,000 m. order for a sugar mill for Turkish interests. Gebrüder Meer of München-Gladbach have taken an order for a rolling mill for Russia and a syndicate including Otto Wolff & Co. is negotiating to supply Russian oil companies with oil production equipment on long term credits. August Thyssen & Co. have abandoned their suit against Friedrich Krupp & Co. over the patents on "stainless" steel held by the latter company.

French Costs Increase

Prices on Most Products Are Firm Although Some Mills Offer Earlier Deliveries

PARIS, FRANCE, Jan. 27.—Probably the outstanding feature of the iron and steel industry since the first of the year has been the widespread increase in production costs. Wages have advanced, fuel is higher, certain taxes have increased and rates on electric consumption are advanced. In the meantime discussion of the new tax measures continues in the Chamber of Deputies, from which still higher costs may result. Demand from domestic consumers has declined, as most manufacturers are more than well stocked with future requirements or have already placed orders with mills for later delivery. With most mills heavily booked with domestic and some export tonnage, there is very little material available for the export market.

Coke.—The price of reparations coke has been increased by 7.15 fr. per metric ton during the first fortnight of January, and an additional 6 fr. for the second

half of the month. For the first half of the month coke sold at 152.30 fr. per ton and in the second half at 158.30 fr. per ton, compared with the December price of 144 fr.

Pig Iron.—Production of phosphoric pig iron is heavy, but the demand is still greater than the supply, with numerous steel works inquiring for basic iron. At the same time the foundry iron market continues firm, with foundrymen complaining that producers have been exporting too much tonnage and leaving too little available for domestic foundry requirements. As a result, the furnaces have added another 5000 tons to the 100,000-ton allotment for domestic consumption in January and February. A supply of 45,000 tons was set aside for March consumption at the same time, but the price has not yet been fixed. The 5000 tons additional for current needs will be sold at the present schedule of 395 fr. (\$14.58) per metric ton. At present No. 3 foundry is quoted at 330 to 340 Belgian francs (\$14.98 to \$15.44), or 400 to 412 French francs (\$14.76 to \$15.20) per metric ton. Hematite iron continues in good demand and the price unchanged at 420 Belgian (\$19.07) or 508 French francs (\$18.75) per metric ton.

Ferroalloys.—Curtailement of production and the recent increase in transportation rates has resulted in a substantial increase in prices. Ferrosilicon, 10 to 12 per cent, is quoted at 735 to 740 fr. (\$27.12 to \$27.30) per metric ton, an advance of about 50 fr. per ton. The 25 per cent grade is quoted at 930 to 935 fr. (\$34.32 to \$34.50) per metric ton and 45 per cent at 1400 to 1410 fr. (\$51.66 to \$52.03) per metric ton, delivered. Ferromanganese, 76 to 80 per cent, is held at about 2100 fr. (\$77.50) per metric ton, delivered.

Semi-Finished Material.—Both the domestic and export markets are active, the latter principally with sales to British mills. There is still a scarcity of available

tonnage. Billets are quoted at 580 to 620 fr. (\$21.40 to \$22.88); blooms at 540 to 570 fr. (\$19.93 to \$21.03) per metric ton for domestic consumption. For export, billets are held at £4 9s. (\$21.63) and blooms at £4 1s. 6d. (\$19.80) per metric ton, f.o.b. Antwerp.

Finished Material.—While prices continue firm mills are beginning to book orders for earlier deliveries than were being offered a few weeks ago. A good volume of export business is reported, chiefly with British, Indian and Japanese consumers. On beams the domestic market is quiet with prices ranging from 620 to 680 fr. (\$22.88 to \$25.09) per metric ton for shipment in 60 days. For export the quotation is £4 17s. 6d. to £4 18s. 6d. (\$23.69 to \$23.93) per metric ton, f.o.b. Antwerp. The bar market is still very firm, with some works still out of the market. Prices range from 650 to 720 fr. (\$23.98 to \$26.57) per metric ton for domestic consumption and £5 6s. 6d. to £5 7s. (\$25.88 to \$26) per metric ton for export. Only small tonnage is available for export but Nord and Ardennes mills have some substantial orders from British users.

Wire Rods.—Although the quoted market on wire rods is 720 to 750 fr. (\$26.57 to \$27.67) per metric ton, evidently few mills are willing to accept business on this basis. The export price is firm at £5 15s. to £5 16s. (\$27.95 to \$28.19) per metric ton, f.o.b. Antwerp. In wire, demand is slightly reduced but prices continue firm.

Sheets.—Deliveries are better and mills that have been out of the market are beginning to accept new business. Medium gage sheets are quoted at 975 to 1000 fr. (\$35.98 to \$36.90) per metric ton for domestic consumption and at £6 per ton (\$29.16), f.o.b. Antwerp, for export. Heavy gages are held at 740 to 800 fr. (\$27.30 to \$29.52) per metric ton domestic, and about £5 10s. (\$27.73) per ton for export.

British Iron and Steel in January

LONDON, ENGLAND, Feb. 11 (*By Cable*).—The production of pig iron in Great Britain in January was 533,500 gross tons and that of steel ingots and castings was 635,700 tons. This compares with 503,400 tons of pig iron and 494,100 tons of steel in December, last year. The January output of both pig iron and steel is larger than its 1925 monthly average.

The production of pig iron and steel for January compared with the monthly average of previous years is as follows in gross tons per month:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Average monthly...	855,000	638,600
1920—Average monthly...	669,500	755,600
1922—Average monthly...	408,500	490,100
1923—Average monthly...	620,000	706,800
1924—Average monthly...	609,900	685,100
1925—Average monthly...	519,700	616,400
January, 1926.....	533,500	635,700

German Machinery Builders Having a Hard Time and Turning to Export

WASHINGTON, Feb. 16.—December was the worst month in 1925 for the German machinery industry, according to a report made by the German Machinery Manufacturers' Association, says a statement issued by the Department of Commerce. Hardly 20 per cent of the industry was occupied in December, the German report says. Hours of labor, which in the first eight months of the year average 52.5 per week, sank to 44 a week in December. At least one-fourth of the plants in December were occupied only from 24 to 40 hr. a week. The number of plants entirely closed down has increased.

In November 76 bankruptcies, amounting to 15 per cent of the total, were in machinery. In the first half of December, 46, or 13 per cent of the total, were in machinery. The decline in domestic orders increased competition for foreign trade, with the result that, during the last months of 1925, no further depression was experienced in export business. According to a recent cable received from Assistant Commercial Attaché D. P. Miller, Berlin, total German machinery exports for 1925 amounted to 370,000 tons, or 33 per cent over 1924.

France Doubles Machinery Exports

WASHINGTON, Feb. 16.—Because of greater activity in the manufacture of machinery in France that country has been a less favorable market for the importation of foreign machines, according to a report sent to the Department of Commerce by Commercial Attaché Chester Lloyd Jones, from Paris. The satisfactory operations in French industry and the developments in exchange assured French machinery manufacturers a good market, discouraged imports and stimulated exports in the past year. The shipments of industrial machinery by weight to foreign countries in 1925 were nearly double those of 1913.

British Metal Prices

A chart showing prices of lead, tin, silver, zinc, copper and tin plate in Great Britain on the first of each quarter for 1920 to 1925 inclusive, and including also the last day of 1925, has been issued by S. W. Carlton & Co., metal merchants and brokers, 32 Lime Street, London, E.C.3. Accompanying the diagram are the highest and lowest official prices for each quarter and also, so far as tin is concerned, the highest and lowest yearly prices for the last 75 years. From the beginning of 1857 the Jan. 1 visible supply of tin is given, with the exception of the war years. The amount on Jan. 1, 1926, was 16,913 tons, compared with 23,370 tons one year ago.

New American Direct Steel Process

A new process for the production of metallic iron directly from iron ore has been developed and patented by Thornhill & Anderson, engineers, West Allis, Wis. The first unit of a commercial plant for carrying out the process is now being designed and fabricated for erection in Japan. It will have a capacity of from 70 to 100 tons of iron per day. The process will utilize a titaniferous iron ore, containing between 35 and 45 per cent iron, using a low grade lignite as fuel and as a reducing agent. Further details concerning the process are unavailable because of the patent situation.

The Japanese rights to this process have been sold to Goro Matsukata of Tokio.

Blast Furnace Project Urged

Philadelphia Foundrymen's Association Tries to Enlist Cooperation of United Gas Improvement Co.

The Philadelphia Foundrymen's Association, at its monthly meeting in Philadelphia Feb. 10, again discussed the project to build by-product coke ovens at Philadelphia in conjunction with blast furnaces. A letter was sent to the United Gas Improvement Co., which has a contract to furnish the city of Philadelphia with heating and illuminating gas, in which the proposition was stated as follows:

"We want to enlist your encouragement in the matter of helping us to bring about the making of pig iron at Philadelphia on tidewater for iron, steel, malleable foundries, open-hearth, crucible, electric and other steel plants within a radius of 100 to 150 miles.

"As you control the gas situation, it would only be necessary for your company to install by-product coke ovens to make hard coke (a by-product to you after the gas is taken out) to supply the new furnaces or furnace for reducing ores, limestone, etc., as your retort coke is too soft for that purpose, also too soft for melting in foundry cupolas, brass furnaces, etc.; we must go west of Altoona for hard coke supply at this time.

"If this is not to your liking, the only other thing

to do would be for the furnace to buy their coal, make the coke and furnish you with the resultant gas (our by-product) at a price to be fixed and sell the resultant by-product to the chemical people or perhaps install a new steel plant and use this gas under the boilers, heating furnaces, etc.

"Will your company supply us with by-product coke or will you take our by-product gas? Of course, we would prefer the former.

"If all this can be accomplished it would make Philadelphia the 'Birmingham of the North' by saving the foundries at least \$2 per ton on their pig."

The letter to the United Gas Improvement Co. further pointed out the loss to the American blast furnace industry because of importations of more than 400,000 tons of foreign iron last year.

It is proposed by the association that a corporation with \$10,000,000 capital be formed to build a coke plant and blast furnace and that the stock be offered for sale to the public.

The letter, signed by Howard Evans, secretary of the Philadelphia Foundrymen's Association, was the work of a committee which consisted of Mr. Evans, Walter Wood of R. D. Wood & Co., cast iron pipe manufacturers at Florence, N. J., and W. W. Hearne, pig iron merchant.

At the foundrymen's meeting an address on "Graphite and Plumbago" was delivered by H. M. Riddle, Jr., treasurer Asbury Graphite Co., Asbury, N. J.

Blast Furnace and Coke Oven Meeting in Pittsburgh

The mid-winter meeting of the Eastern States Blast Furnace and Coke Oven Association, held at the William Penn Hotel, Pittsburgh, Feb. 12, represented something of an innovation in such gatherings. Previous gatherings of this organization have usually consisted of a get-together meeting during the day, followed by a dinner and the presentation of a paper in the evening. This time it was an all-day meeting, with morning and afternoon sessions, at which papers were presented and discussed and the meeting closed with a dinner in the evening.

Dan M. Rugg, Koppers Co., Pittsburgh, president of the association, introduced at the morning session T. L. Joseph, United States Bureau of Mines, Pittsburgh, who read a paper, the joint work of himself, P. H. Royster and S. P. Kinney, also of the Pittsburgh station, on "Effect of the Physical Properties of Ore and Coke on Blast Furnace Capacity." Following a luncheon at noon, Mr. Rugg read a paper on "Experiences in Supplying Coke for Two Separate Blast Furnace Operations from One Coke Plant." He was followed by B. W. Winship, superintendent coke plant, Bethlehem Steel Co., Steelton, Pa., whose subject was "Selective Segregation of Coking Coal at the Mine and Its Preparation at the Ovens."

All of the papers were well received and were freely discussed, particularly that by Mr. Joseph, which found much support from those active in directing merchant furnaces, but the findings of which did not appear to appeal so strongly to the operators of the large steel works furnaces. This same paper was presented at a blast furnace conference held under the auspices of the Engineers' Society of Western Pennsylvania in Pittsburgh, Nov. 12, last year. It deals with the experiments conducted by the Bureau of Mines at 13 blast furnaces, mostly of small capacity. It stresses the desirability of uniformity in the size of ore and coke from the standpoint of efficiency and the greater ease in fusing ore of small than large size.

May Consider Specifications for Coke

The several papers and their discussion brought out the suggestion that the association should broaden the scope of its activities and that one step in this direction should be the appointment of a standardization committee to work out in conjunction with the Bureau of Mines and the American Society for Testing Materials a set of standard specifications, which would

minimize if they did not entirely eliminate the constant strife between coke producers and blast furnace operators over the quality of the coke. The appointment of such a committee was favored by several in an informal discussion following the dinner, although there was also the suggestion that membership of such a committee, because of the many things to be considered, should be composed of men "capable of simultaneously integrating an equation and cleaning a tuyere."

The gathering brought together about 150 blast furnace and coke oven operating men from Cleveland, Youngstown, Buffalo and eastern Pennsylvania.

National Metal Trades Association to Meet in April

The National Metal Trades Association will hold its twenty-eighth convention in New York, April 15 and 16 at the Hotel Astor. The first session will open on Thursday, April 15, at noon. The last session will be a banquet Friday evening. At the time of the convention there will be held also the annual spring meeting of the secretaries of the 30 branches of the association, and there will be the usual so-called alumni banquet.

New York Steel Treators February Meeting

The regular monthly meeting of the New York chapter of the American Society for Steel Treating, instead of being held on the evening of Feb. 17, has been postponed to Feb. 24 because of the convention of the American Institute of Mining and Metallurgical Engineers in New York the week of Feb. 15. At the meeting on Feb. 24 the principal speaker will be E. C. Bain, metallurgist Union Carbide and Carbon Research Laboratories, Inc., Long Island City, N. Y., who will discuss various phases of the alloys of chromium and iron and of chromium steels.

Engineering Foundation Elects Officers

At the annual meeting of Engineering Foundation Feb. 11, the following officers were elected for the ensuing year:

Chairman, Lewis B. Stillwell (member, American Institute of Electrical Engineers, American Society of Civil Engineers).

Vice-Chairmen, Elmer A. Sperry (member, American Institute of Electrical Engineers, American Society of Mechanical Engineers), and George A. Orrok (member, American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Civil Engineers).

Additional members of executive committee, J. Vipond Davies (member, American Institute of Mining and Metallurgical Engineers, American Society of Civil Engineers), and Arthur M. Greene, Jr. (member, American Society of Mechanical Engineers).

Director and secretary, Alfred D. Flinn.

Treasurer, Jacob S. Langthorn.

Assistant treasurer, Henry A. Lardner.

Otis Steel Co. Authorizes Additions and Improvements

Directors of the Otis Steel Co. have authorized expenditures for improvements and additions to the company's plant which are expected to effect substantial savings in operating costs. One of the most important of these proposed betterments is the increase in the power plant equipment. At a cost of about \$450,000 it is planned to double the power plant at the blast furnaces.

The company's power plant at the Riverside works will be maintained as a reserve unit. In addition, it is planned to install turbo-blowers at the blast furnaces, replacing the present blower engines. These improvements, all told, will cost about \$800,000.

Still another betterment under consideration covers the conversion of the jobbing mills to sheet mills. This change is designed to bring the company's products into a higher priced and a more profitable market.

Steel Corporation's Unfilled Orders Decrease in January

A decrease in the unfilled orders on the books of the United States Steel Corporation was reported as of Jan. 31. The total aggregated 4,882,739 tons, a decrease of 150,625 tons from the total of 5,033,364 tons on Dec. 31, 1925. This decrease is the first one since August, last year. The increases were 451,584 tons in December, 472,597 tons in November, 391,886 tons in October and 204,494 tons in September. Decreases previous to September had been registered from March to August inclusive. A year ago the unfilled business was 5,037,323 tons or 154,584 tons more than for January, this year. Following is the unfilled tonnage as reported by months, beginning with January, 1924:

		1926	1925	1924
Jan.	31.....	4,882,739	5,037,323	4,798,429
Feb.	28.....		5,284,771	4,912,901
March	31.....		4,863,564	4,782,807
April	30.....		4,446,568	4,208,447
May	31.....		4,049,800	3,628,089
June	30.....		3,710,458	3,262,505
July	31.....		3,539,467	3,187,072
Aug.	31.....		3,512,803	3,289,577
Sept.	30.....		3,717,297	3,473,780
Oct.	31.....		4,109,183	3,525,270
Nov.	30.....		4,581,780	4,031,969
Dec.	31.....		5,033,364	4,816,676

The high record in unfilled orders was 12,183,083 tons, at the close of April, 1917. The lowest was 2,674,757 tons, on Dec. 31, 1910.

Large Wire-Weaving Loom

What is reported to be the widest loom ever built was completed several weeks ago at the plant of Franz Irmischer, Saalfeld, Germany. The loom, which was designed for weaving wire cloth, has been installed in the plant of Andreas Kufferath, Marianweiler, Germany. The weaving width is given as 296 in. (24 ft. 8 in.).

Total net weight of the new loom is 92,000 lb. The overall length is 36 ft., with a width of 9 ft., and height of 14 ft. It is operated at 23 strokes per min. by a motor of 9 hp. The weight of the warp beam of gray iron is 15,000 lb. The cloth beam, also of gray iron, weighs 10,000 lb., and the top shell 9000 lb. The American representative of the maker is M. A. Irmischer, 48 East Forty-first Street, New York.

Economy in Electric Production

Public Utility Current Takes Only Two-Thirds as Much Fuel Per Unit as Six Years Ago

Steady gain in efficiency has been made in the production of electric current by fuel, as reported by the United States Geological Survey. This follows a continuing decrease in unit consumption since the war. In 1919 total output of current by use of coal, oil fuel and gas amounted to 24,176 millions of kwhr. This was obtained by the burning of 38,880,000 net tons of coal and other fuels, the equivalent for oil being figured at 4.2 bbl. per ton and for gas at 22,000 cu. ft. per ton. The consumption worked out at 3.22 lb. per kwhr.

Preliminary estimates for 1925 show 43,233 millions of kwhr. produced by the consumption of 44,700,000 net tons of fuel, computed as before. This works out at 2.07 lb. per kwhr., a reduction of nearly 36 per cent from the 1919 rate. That this reduction has been continuous is shown in the table:

Production of Electricity and Fuel Consumed

	Electric Output, Millions of Kwhr.		Equivalent Coal Consumption	
	Total	By Fuels	Thousands of Net Tons	Pounds Per Kwhr.
1919.....	38,921	24,176	38,880	3.22
1920.....	43,555	27,248	41,420	3.04
1921.....	40,976	25,863	35,240	2.73
1922.....	47,659	30,240	38,000	2.51
1923.....	55,674	36,092	43,522	2.41
1924.....	59,014	38,808	43,130	2.22
1925.....	65,801	43,233	44,700	2.07

It will be particularly noted that, although there has been an increase of 79 per cent between 1919 and 1925 in the production of current by fuels, the increase in total consumption of fuels has been far more moderate. Thus, in the period covered the increase in fuel usage was only 15 per cent. Evidently, if the efficiency had remained at the 1919 level, consumption must have been 69,530,000 tons, or approximately 25,000,000 tons more than was used in 1925.

Carnegie Steel to Build Warehouse at Houston

The Carnegie Steel Co., Pittsburgh, has completed plans for a warehousing and fabricating plant at Houston, Tex. All legal formalities in connection with the transaction of business in that State have been complied with, and a tract of 100 acres has been purchased on the north side of the ship channel at Houston. The site is a portion of what is known as the Ruby-Colby tract, being located below the turning basin, between properties of the Humble Oil Co. and the Southern Pacific, Morgan Line, where new docks for that steamship company are being constructed.

The warehouse and fabricating organization will be operated along lines similar to the already established warehouses of the company in Pittsburgh, Baltimore, Boston, Newark, N. J., and Cleveland.

With the completion of the intercoastal canal along the Gulf it will be possible to transport steel products from the Carnegie mills by barge down the Ohio and Mississippi Rivers directly to the proposed warehouse at Houston.

At the present time large tonnages of steel products are being carried by river barges owned and operated by the Carnegie Steel Co. as far as New Orleans, where the cargoes are transferred to ocean-going barges or to railroad cars for distribution in the Southwest.

Electric Equipment Awards

The Pittsburgh Crucible Steel Co. has placed the electrical equipment for its new 18-12-in. bar mill. The Allis Chalmers Mfg. Co. will furnish a 1500-kw. motor-generator set and one 1800-hp. motor with control and switchboard, while a 2000-kw. motor-generator set, one 500-hp., one 750-hp. and one 1200-hp. motors have been awarded the General Electric Co. The Aluminum Co. of America has bought for one of its Southern plants two 25,000-kw. vertical water wheel type alternators and seven 8333 kva. transformers from the General Electric Co.



BOOK REVIEWS



The Planning, Erection and Operation of Modern Open-Hearth Steel Works. By Hubert Hermanns, translated by Wesley Austin. Pages viii + 307, 7 x 10 in.; illustrations and diagrams, 273. D. van Nostrand Co., New York. Price, \$10.

Books relating entirely to the open-hearth process of steel making are few in number, particularly in English, and such books as we have cover principally the metallurgical features of the process. The present volume is very similar in its scope to that published by Victor Windett in 1920 in that it is concerned chiefly with the planning, design and erection of the open-hearth furnace, the plant and the various auxiliaries. The metallurgical details are only briefly considered. It is therefore of chief interest to the steel plant engineer, the man interested in movement of materials or the open-hearth superintendent interested in heat efficiency and improvements in plant.

It must be remembered that this is a German book written with German problems in mind and for a German or at least European circle of readers. While illustrations are drawn freely from American, English and French sources, yet the majority of the illustrations and examples are from German plants. This is one of the chief values of the book, the bringing together, from scattered sources, of information regarding German design, plants and practice. It is also one of the dangers because we cannot apply much of the information directly to our conditions. The reader should have this carefully in mind and as far as possible acquaint himself with German conditions.

There are six chapters following a short historical introduction. The first chapter of six pages is on the metallurgical principles of the open-hearth. It relates entirely to basic practice and is not particularly accurate nor very good. While the work of translation is extremely good on the whole, there are many places where more care should have been taken. For instance, in this chapter, the average reader would be quite confused by the term "liquid steel pig iron." Practically throughout the book the metric system of weights and measures is used which, while it aided the work of the translator, makes it much harder for the average reader.

Chapter 2, of 14 pages, is on the location of the open-hearth plant in relation to the rest of the steel plant. It is chiefly of general interest. Some of the terms used look peculiar to us. On page 29 describing an American duplex plant, "plug shop" would seem to refer to a place for making converter bottoms, "pig iron weighbridge" is very evidently a scale for weighing blown metal on its way to the open-hearth. On page 30, another American plant "casting table" refers to the pouring platforms.

Chapter 3, of 40 pages, takes up the various parts of the open-hearth plant. The author's ideal plant on page 37 would be severely criticized from an American standpoint. The gas main is common to all the furnaces, the mixers are poorly placed and of small capacity, the track layout is not suitable to our conditions and the size of the ideal furnace is given as 50 tons. The middle part of this chapter on "Transverse Section of Open-Hearth Steel Works" is extremely good with many clear illustrations and a good discussion of this important question.

The most valuable material in the book is probably in Chapter 4 dealing with details of furnaces, producers and auxiliary apparatus. It is a long chapter of 177 pages. In the opening pages there is the interesting suggestion that alloy steel be used in modern mill building construction to take care of the increased stresses with larger buildings, heavier cranes, etc., and to save weight. There is a splendid section on furnace design including a good discussion of small open-hearth furnaces. In speaking of tilting furnaces, which are carefully considered, the framework is given as wrought iron although it should be steel. This chapter includes

a very good consideration of all the essential parts of the furnace and the open-hearth plant including producers. To meet German conditions producers for lignite and low grade fuels are taken up in detail, including the slagging type producers.

Chapter 5, of 13 pages, takes up methods of improving the heat efficiency of the process, dealing in a very interesting way with low temperature producers and the saving of by-products, the use of gases of high heating value, waste heat boilers, heat insulation, etc. The last chapter considers briefly duplex and triplex processes which the author does not consider particularly applicable to German conditions. There is finally a long bibliography of important articles and books on open-hearth subjects.

G. B. WATERHOUSE

Practical Marine Diesel Engineering. By Louis R. Ford. Pages 506, 6 x 9 in.; 264 illustrations. Simmons-Boardman Publishing Co., 30 Church Street, New York. Price, \$7.50.

Intended primarily for the use of men directly interested in the operation and maintenance of the Diesel engine, this book describes the principal types of Diesel engines which have been brought out both in Europe and in the United States. Double-acting engines of the Worthington and other types are accorded a separate chapter and form in some respects the most up-to-the-minute item in the book. In an art advancing as rapidly as this, it is impossible for an author to assemble his data, write his story and read the proof before much of the material he has gathered so laboriously has become a part of past history and no longer applies to the latest machines.

In laying down the general principles upon which all Diesel engines operate, the foundation for the entire study is prepared. The discussion proceeds from consideration of the principal fixed parts of the engine to the running parts and miscellaneous accessory equipment. Four-cycle and two-cycle single-acting engines precede the discussion of the double-acting engines. Engines of medium and small sizes are given a good deal of space, running from one cylinder upward.

The last half of the book is devoted to Diesel engine operation, with particular reference to the use of the engine on shipboard. Derangements in operation, setting cylinder head valves, adjusting bearings, lubrication, operation of air compressors, indicating the engine and other matters follow. The last chapter covers questions and answers involved in obtaining a license as a motor-ship engineer. The rules of the Board of Supervising Inspectors of the United States Steamboat Inspection Service are given at some length.

Special Libraries Directory. Compiled by May Wilson. Pages 254, 5½ x 8½ in. Published 1925 by Special Libraries Association, 195 Broadway, New York. Price, \$4.

Special libraries to the number of 975 are listed and their spheres outlined in this book. These are scattered all over the United States. The directory consists of a classified list, a geographic index, a title index, a personnel index, and a subject index. Needless to say, it is cross-indexed voluminously. Each of the separate libraries has a key number based on its order of position in the classified list.

Of the total number of libraries 65 are industrial, these being divided among 19 classes of industry, with electrical subjects leading the list with 20 libraries. Altogether, nearly 400 of the libraries touch on industrial subjects.

The present volume is the second edition of a work which first was published in 1921. The survey which is its basis was made over a period of 12 months. Most of the information regarding each separate library was obtained from its librarian. No general, public, college or school library is included in the list.

The sources of information covered are highly specialized and every effort has been made by methodical arrangement and careful indexing to render available the information which these sources contain.

Tragedy of Waste. By Stuart Chase. Pages 296, 5¼ x 6½ in. Published by Macmillan Co., 60 Fifth Avenue. Price, \$2.50.

Four main channels of waste, analyzed in this book, are wastes in consumption, idle manpower, wastes in the technique of production and distribution, and waste of natural resources. Each of these is subdivided into about ten groups and each group independently studied. Wastes in consumption, here denominated "illth," are centered largely on the military establishment, drugs, liquor and tobacco, crime and commercialized vice, and other elements.

More specifically applicable to the manufacturing industries is the study of waste in production, with its corollary, idle manpower. Intermittent employment due to business conditions, a portion of which is regarded as preventable through improved industrial planning, is charged with the loss of 400,000 man-years in the United States. Seasonal loss in manufacturing, construction, mining, etc., is given as 2,350,000. Turnover loss in change of employment is the equivalent of 1,200,000 workers always idle. Strikes and lockouts are charged with 1,800,000.

Passing on to wastes in production, and basing the study on the analysis of six industries made by the Federated American Engineering Societies several years ago, the metal trades are given a severe wallop. Comparing the performance of the best plant studied with that of the average plant, the six industries are listed as follows:

	Best Plant	An-Average Plant
Building industry.....	1.5	1
Textile industry.....	1.5	1
Men's clothing industry.....	2	1
Printing industry.....	2	1
Boot and shoe industry.....	3	1
Metal trades.....	4.5	1

On the basis of these figures the inference is that "if all metal factories could be run as efficiently as the best metal factory studied, the industry would improve its performance from 1 to 4.5, or by 350 per cent." Most of the wastes in all of these industries are charged to management. In the metal trades, particularly, 81 per cent of the waste is said to be due to management, 9 per cent to labor and 10 per cent to outside causes.

Throughout the book emphasis is placed upon the inherent desirability of coordinating all effort toward a given ultimate end, instead of directing individual efforts toward that end without regard to their repercussion upon other individual efforts directed along other lines. This program would connote a planning board of vast responsibilities and unheard of prescience, which would gather the reins of industry into one hand and guide it in all its multitudinous ramifications, to the end that no portion would duplicate unnecessarily what another portion was doing, that there would be no cross or counter currents in production, distribution or consumption, and that nothing would be produced which would not have real use in the scheme of our living.

While from its very character a good deal of the text of the book is of the nature of fault-finding, without prescribing remedies, some of the features are of such startling character that industrial leaders might, with much benefit, make themselves acquainted with them. The effort to be all inclusive has, of course, loaded the book with much material entirely outside the scope of the manufacturing executive, but there is so much in it directly in his line that it would well repay studying.

"One difficulty recognized by economists," says the author, "is the tendency for bankers to run industries about whose technical problems they know nothing. There have been kings in railroads, steel, tin plate, copper, motor cars, etc., who did not know a screw thread from a resistance coil. They have been astute in handling stocks and bonds, but they could not design a hen house. There is a distinct tendency for the in-

vestment banker to take a larger control of industrial affairs, as against the technical business man. Control by the banker is bad for industry, in that it always seeks to restrict output to that point where the largest safe return may be made in dividends, rather than the maximum in public service." S. G. K.

Niagara in Politics—a Critical Account of the Ontario Hydro-Electric Commission. By James Mavor. Pages 255, 5¼ x 7½ in. Published by E. P. Dutton & Co., 681 Fifth Avenue, New York. Price \$2.

Attention has been directed to the Ontario Hydro-Electric organization because of its having the greatest publicly owned plant in the world. It has been developed from a single isolated municipal plant into a great state-wide system "which has outstripped every other electric power-producing and distributing plant" in the world. Doctor Mavor contends that this is not a typical example, however, of public ownership. "It is really an attempt on the part of a small number of politicians to establish an industrial monopoly and to manage this monopoly in such a way as to keep themselves in power."

Distinguishing between Government ownership and Government operation of public utilities, the author regards Government operation as a dangerous and destructive fallacy. He charges the commission with having saddled the Province with an enormous debt and with having embarked upon a series of complicated industries, the returns from which must be of a fluctuating and speculative character. Growth to a proportion much larger than its promoters dreamed has created a veritable Frankenstein, according to Doctor Mavor, which "controls both its own officials and the Government of the Province. To the public it has become an almost intolerable burden."

A more scathing arraignment of Government operation would be difficult to produce. The findings are in line with American experience with both Government operation of ships and Government operation of the railroads. However necessary these may have been in the emergency of war, there is little that can be said in favor of such governmental enterprises in times of peace. S. G. K.

Physical Chemistry in Steel Making

"The Physical Chemistry of Steel-Making Processes" is the title of a pamphlet issued by the Faraday Society 90 Great Russell Street, London, England. It contains the general discussion of this subject which took place at the joint meeting of the Iron and Steel Institute and this Society, June 8, 1925, in London. Copies can be secured for 8s. 6d. net.

"Kempsmith Milling Machines" is the title of a cloth bound book recently published by the Kempsmith Mfg. Co., Milwaukee. This book sets forth practical suggestions applicable to railroad and automotive shop practice, as well as to electrical equipment manufacturers, steam appliance builders, tool and die makers and general contract or repair workshops. Many unusual and high production methods are illustrated and described in such manner as to be useful to the shopman, designer, executive and production man. A substantial portion of this book is devoted to practical information, such as index tables for use with universal dividing heads, rules for cutting gears and threads, gear tooth proportions, metric conversion tables, belts, grinding wheels and allowances, suggested heat treatments, weights and measures, common geometrical problems, allowances for shrink fits and safe loads on ropes and chains.

A pocket-size list of physicians and dentists all over the United States and Canada has been issued by the Travelers Medical Guide, 293 Central Park West, New York, for the use of traveling men generally. It is published for the National Council of Traveling Salesmen's Associations and is priced at \$1. This is said to be the first compilation of this character.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

CURTAILMENT of iron and steel production will help maintain prices; readjustment more rapid than usual.

Overproduction in steel is not serious in light of consuming demand.

Showing of unfilled orders is unfavorable. Downward readjustment in pig iron prices is likely to be slight.

Both steel and pig iron are cheap in comparison with general commodities.

The schedule of the next installments of Doctor Haney's analyses follow: Feb. 25—General business outlook; March 4—Status of steel consumer demand; March 18—Position of iron and steel producers.

ONE of the most notable developments in the iron and steel situation as revealed by January statistics is the fact that the trend of steel ingot production turned downward. This statement is based upon the following reasoning. In January there were produced 4,153,500 tons of steel ingots, an increase of about 4.3 per cent over December. Usually, however, steel ingot production increases during this period by about 6.8 per cent. Consequently the January increase is less than usual and our seasonally adjusted index declines (see Fig. 1). This is in accord with the forecasts made by the author's P-V line.

It is a favorable development, in that steel production was undoubtedly being expanded too rapidly. In fact, according to our estimates of normal requirements, steel ingot production in December had reached a point about 19 per cent above normal and in January was still 16 per cent above. This certainly suggests the need of a more careful adjustment of production.

Overproduction is not so serious as these percentages above normal would at first suggest. It will be remembered that our index of activity in the steel using industries shows that the consumption of steel is also running above normal and consequently some part of the supra-normal steel output merely reflects the large requirements of consumers.

The showing made by the unfilled orders of the Steel Corporation is not encouraging. Usually there is a small gain in unfilled orders during January. This year, however, there was actually a loss of about 3 per cent. Our adjusted index number fell to 88.8 per cent of the average for 1921 against 92.4 per cent at the end of December. The total was smaller than at the end of January, 1925. While it should be recognized that forward buying has for a long time been smaller in amount than it used to be, the fact remains

that this change in trend (the first downward movement since August last year) is an unfavorable indication.

THE IRON AGE index of finished steel averaged 2.45c. in December and the January average of 2.439c. is, therefore, a small but appreciable decline. On Feb. 4 the index had fallen to 2.424c. It is true that this decline is almost entirely due to the weakening of sheets, but the impression gained from a study of trade reports is that the market shows a weaker tone in some other items, such as plates. It may be remembered, also, that not infrequently sheets have been barometric in the price structure and their decline in the early months of 1924 and again in 1925 anticipated a similar movement in other finished steel items.

Certainly no sustained strength is now in sight for steel. As long as steel ingot production is so much above normal and so large in comparison with the unfilled orders, the market will do well to continue stable.

Overproduction of Pig Iron?

IN contrast with steel, pig iron production showed a continued upward trend in January. Usually the January output of pig iron is in the neighborhood of 4 per cent below December, while this year there was a good-sized increase. An allowance for seasonal variation, therefore, emphasizes the January gain. According to the New York University Bureau of Business Research, the output of pig iron was more than 20 per cent above estimated normal requirements. This means that it is also relatively large in comparison with ingot production. In fact, it seems fair to say that in January the production of pig iron was excessive.

Nevertheless the pig iron market has held some-

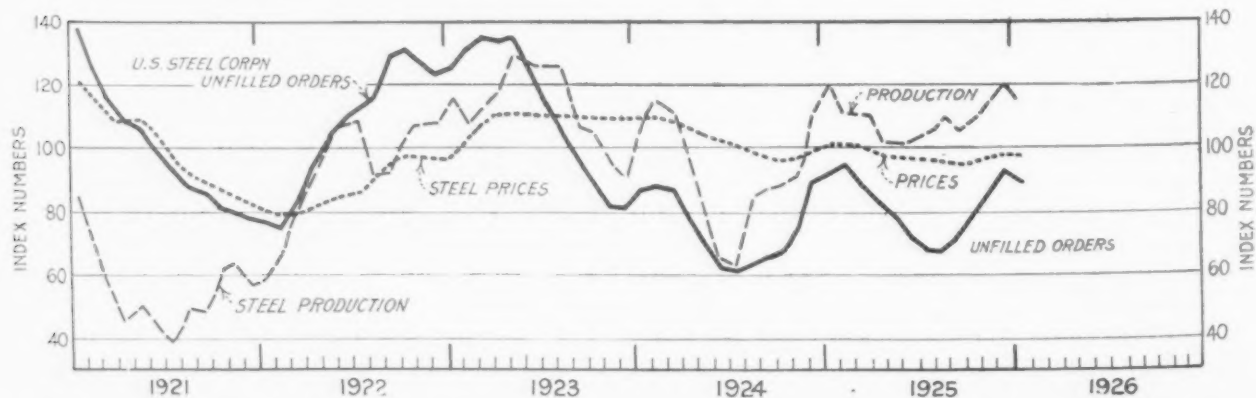


Fig. 1—As the Trend of Unfilled Orders Turns Downward, Manufacturers Are Wisely Curtailing Output to Forestall Price Weakness

In This Issue

Another research corroborates opinion that 1926 will be big building year.—Normal growth of building requirements now placed at nearly \$4,500,000,000.—Page 483.

Production of pig iron thought to be excessive in January.—Upward trend of output continued during that month: Curtailment of steel tonnage likely to help price situation.—Page 498.

Suggests new definition for coke "combustibility."—"Rate of complete gasification in front of tuyeres of a blast furnace under standard conditions of blast temperature and of blast volume."—Page 477.

Study of electrical resistance in steel when being heat treated reveals information not obtainable with usual method of "thermal analysis."—May explain some of the little understood difficulties in heat treating.—Page 478.

Research work on refractories aids investigation of consumer complaints.—Mellon Institute fellowship also gives free consultation service on refractory problems.—Page 479.

Says use of scrap in blast furnace charges cuts coke consumption 30 per cent.—Claims 60 per cent increase in output: one disadvantage is lower carbon in pig iron.—Page 481.

If ore production increases for next 25 years at same rate as last 25, we will be producing 100,000,000 tons of ore annually.—Probable that Lake ores will be exhausted within 40 years.—Page 484.

Much metal wasted in foundry processes by excessive allowances for finish.—Minimizing of machine operations by reducing amount of metal to be removed, saves large amounts.—Page 487.

Corporation's unfilled orders decrease in January.—Drop 150,000 tons to 4,882,739 on Feb. 1: first decrease since last August.—Page 495.

Suggests annealing as cure for free phosphides in manganese steel.—German metallurgist thinks long-continued annealing will force them in solution.—Page 482.

Thick-walled hollow steel ingots worked by grooved rolls to form seamless tubes.—Pilger process employs new principle; most practical on sizes below 16 in.: two mills now in this country.—Page 473.

Construction contracts awarded in January highest ever for first month of year.—\$450,000,000 worth of new construction started east of Rockies.—Page 503.

Discover practical method for determining amount of gases in metals.—Applicable to determination of oxygen in pure iron, steel, pig iron, etc.—Page 502.

Too much importance often given to "unfilled tonnage" figures.—Old habits of annual contracting no longer hold true; "gains" and "losses" may be deceiving; shipped tonnage more valuable as barometer.—Page 507.

Price ranges for steel products more logical than fixed price level.—Today some orders, more profitable than others, call for concessions; absence of contract relationships forces seller to use of range quotations.—Page 506.

Drill steel successfully tempered by aid of ordinary magnet.—When drills refused to attract magnet, heating was finished and quenching followed.—Page 509.

Railroad trainmen make impossible demands for increased wages.—Even though trainmen's wages have lagged behind railroad average, there is no source from which the increase could come without materially harming business.—Page 507.

Tentative standards adopted for plow bolts.—Description of types approved; 42 varieties expected to meet demands of trade.—Page 505.

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How It Is Done Abroad

CLOSE to three-fourths of the steel tubing made in Germany last year was of the seamless variety. In this country the proportion is about one-eighth. It is not strange, therefore, that all eyes should be on the methods of manufacture in German plants. Much discussion there has been, but little definite information. For this reason THE IRON AGE went to some lengths to secure the leading article in this week's issue, the first adequate summary of the chief methods in use abroad for the production of seamless tubing.

Paul Cebrat made an extensive study on the Continent of the latest improvements. The analysis of German methods is not merely a summary, however; there is considerable new information with regard to improvements on earlier methods. The whole forms a valuable addition to the literature of tube manufacture.

For News Summary See Reverse Side

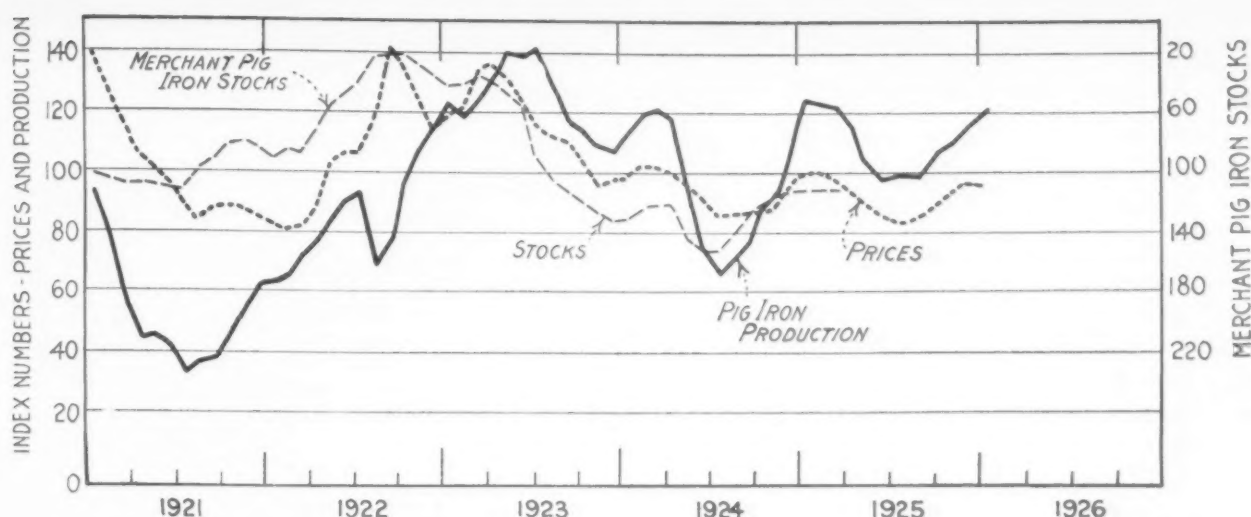


Fig. 2—Pig Iron Production Is Now Considerably Above Normal, but It Is to Be Noted That Steel Production Is Also High and Consumption Large

what more firmly than the average for finished steel products, remaining unchanged throughout January at \$21.54, according to THE IRON AGE index. January, however, is the first month since last July in which the monthly average price of pig iron failed to move upward and possibly this checking of a steady advance is as significant as a decline.

Judged by statistical data, it seems almost certain that weakness is to be expected in pig iron in the near future. The excess of production referred to above is very similar to that which existed early in 1924 and again in 1925. If it had not been for the uncertainty of the coke market and the tendency to curtail pig iron production due to high coke prices, a decline would have come before this.

This is not to say that the market is as weak as it was at the earlier dates mentioned, for the situation at the beginning of 1926 differs from those periods in several respects. In the first place, the price is considerably lower than it then was. In the second place, stocks of merchant pig iron (which are often barometric) are believed to be constantly smaller. In the third place, the production of pig iron is not so much out of line with the steel ingot output. Finally, there is no indication of any such general or considerable decline in finished steel as occurred in 1924 and 1925. Therefore, though pig iron is likely to suffer a downward readjustment it does not at present seem probable that the change can be anything but slight.

Commodity Prices Lower

IN the price graph (Fig. 3) is presented a picture of the general commodity price level in comparison with finished steel, pig iron, and steel scrap. It appears that Bradstreet's index has moved lower for two

consecutive months. On Feb. 1 it was 2½ per cent under its position on Jan. 1.

Usually the composite index of finished steel prices moves in sympathy with the general price level, following the Bradstreet index within a few months. While commodity prices are at present very irregular and their trend uncertain, it seems probable that a little downward readjustment in finished steel is indicated.

This conclusion is strengthened by the trend of scrap prices. Heavy melting steel has been declining for about two months. Finished steel has been known to remain stable while scrap declined, but scrap is so frequently barometric that its present trend creates some presumption that a moderate decline in steel is probable. No sign of strength exists in the scrap markets and all indications are that raw material will work irregularly lower—perhaps moving down to about \$17 for heavy melting scrap at Pittsburgh.

Rarely, if ever, has pig iron failed to decline when scrap has steadily declined for as long a period as two months. In view of the statistical position of pig iron as pointed out above, it is difficult to see how pig iron can fail to show a small decline. The price of pig iron is relatively high in comparison with both billets and bars and it is now, as scrap continues to weaken, getting out of line with that closely related material.

Imported pig iron, too, continues to press upon the market. It may be as claimed by some that this condition is temporary and that the foreign prices are stiffening. The fact remains that the pressure is there and is a source of weakness for the near future.

One thing is certain, however, and that is that both pig iron and steel are relatively cheap; that is, iron and steel are low in comparison with the general

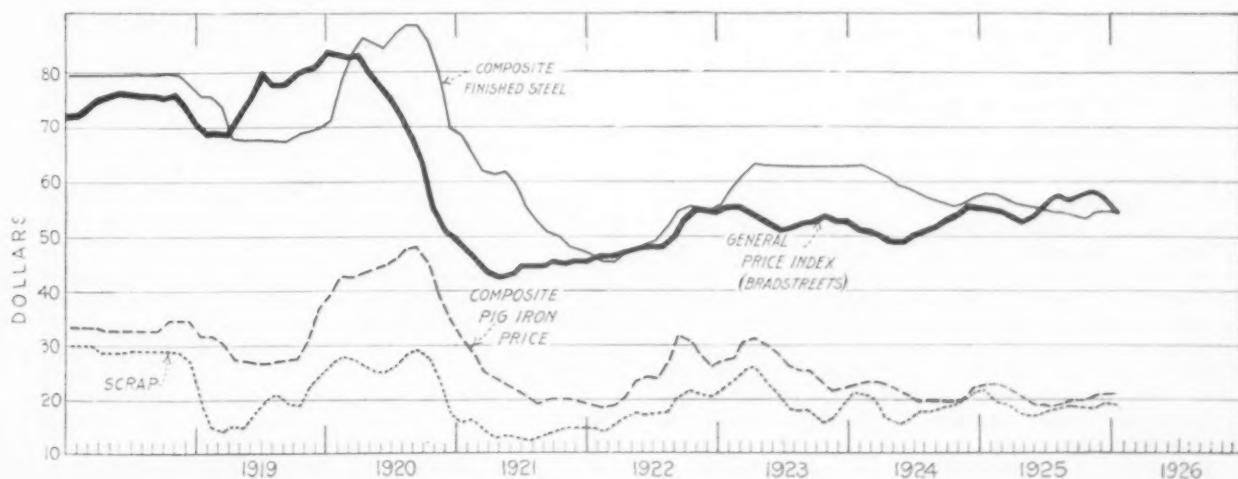


Fig. 3—The Index Number of General Commodity Prices Has Now Moved Downward for Two Months: Some Readjustment in Steel Prices Is Indicated

level of commodity prices. In fact, they are so low that it should be generally recognized that any decline cannot go very far. Moreover, buyers will note that there has been a more prompt curtailment of produc-

tion than usual. As already pointed out, the trend of steel production has turned downward and reports of the banking of furnaces indicate that the pig iron output is following suit.

GASES IN METALS

New Method for Determining Oxygen and Hydrogen by Fusion in Vacuum

A satisfactory method for determining the amount of oxygen and hydrogen in metals, which is generally applicable, has been developed by the United States Bureau of Standards. The method employs the principle of fusion of the metal in a vacuum, and the absorption of the resulting gases by suitable solid absorbents in tubes placed between the crucible and vacuum pump. A complete description of the method is given in Scientific Paper No. 514, of the bureau.

Nearly all metals contain small amounts of oxygen, hydrogen, and nitrogen, and these are frequently spoken of as "gases in metals," whether or not they exist as oxides, hydrides and nitrides, or in some other form. Many differences in quality of metals not readily attributed to differences in composition, as determined by the usual chemical analyses or to different physical treatments, are supposed to be caused by the presence of "gases" in the metals.

In the past, satisfactory and generally applicable methods for determining oxygen in metals have not been available. After many experiments, the vacuum fusion method, in which a small solid sample of the metal is fused in a gas-free graphite crucible, was developed. The water vapor, carbon dioxide, carbon monoxide and hydrogen evolved during the heating and fusion of the sample are absorbed as above described. The total oxygen and hydrogen in the sample can then be calculated. The method does not distinguish between oxygen present in the metal as carbon monoxide, carbon dioxide, oxides of non-metallic inclusions or of metallic constituents. Under the conditions of this analysis the recovery of oxygen from the oxides of iron, manganese, silicon, aluminum, titanium and zirconium is complete. The presence of sulphur in the iron or steel sample does not interfere with the determination of oxygen by this method.

The method is applicable to the accurate determination of oxygen in pure iron, steels, cast irons and pig irons, and also in many non-ferrous metals and alloys.

Metallographic Etching Reagents for Alloy Steels

A knowledge of the structure of metals and metallic alloys is essential in determining the physical properties and characteristics to be expected of them. It is usually obtained by noting under the microscope the details of structure developed in a polished section of the metal or alloy specimen by etching with a suitably chosen solution of acid, salt or alkali. Distributed throughout the etched microsection of carbon steels, alloy steels and ferroalloys, there can be seen hard particles of a constituent, formed by the combination either of carbon with the iron or alloying element or of the alloy element with iron, imbedded in the relatively soft matrix. By etching with an acid these particles are brought out as uncolored masses in strong relief against the darker, corroded matrix. No distinction can thus be made between two or more different constituents that may be present in the same microsection, excepting possibly by a consideration of the form of the particles in cases where one or more of these constituents possess a well established and easily differentiated form. The identification of certain constituents has, however, been made possible by etching with special alkaline solutions.

Results of an investigation carried out at the Bureau of Standards are described in Scientific Paper No. 518, which has just been issued. Copies are now on sale

at the office of the superintendent of documents, Government Printing Office, Washington, at 25c. each. In this paper, data are given for the differentiation, by etching either by immersion in various solutions of an alkaline nature or electrolytically in solutions of weakly dissociated acids and their salts, and of alkalis, of constituents present in alloy steels and ferroalloys containing chromium, tungsten or vanadium, and in high-speed steels. The underlying principles governing the action of these solutions on the constituents are also stated.

Making Nation-Wide Survey of Government Purchasing

WASHINGTON, Feb. 16.—Economical purchases for all Government departments is the purpose sought by Brig. Gen. H. M. Smither, chief coordinator, who has authorized a nation-wide survey of the Government's purchases. The survey is being conducted by J. A. Egleston, coordinator for purchases. The immediate plan of the survey is to cover products that are the most used and cost the most, but ultimately every commodity bought by the Government will be included.

It has been pointed out by officials that it is not practical for the Government to make purchases in the same way in all instances. On some occasions, it was explained, it will be advisable to pool all purchases to get the benefit of a price reduction. At other times it will be more profitable to let each department or establishment enter the market individually. The latter method applies where the Government departments use virtually the entire available supply of a commodity and when purchases are made individually in such instances better prices are obtained, it is declared.

The present survey is the first time that so general a study of purchases has been attempted, although many coordinating practices have been introduced into the affairs of the Government. In addition to studying the nation-wide buying system for all departments, the coordinator for purchases will also represent the departments on certain occasions as purchasing agent. This practice will be followed when it will be beneficial to group purchases of the departments.

While the coordinator's office has carried out a part of the program, it has not yet been fully established but with completion of the survey and application of the program determined upon it will have attained its full development.

The annual meeting of the Iron and Steel Institute will be held Thursday and Friday, May 6 and 7, at the house of the Institution of Civil Engineers, Great George Street, London. It is expected that the autumn meeting will take place in Stockholm, Sweden, through the invitation of the Swedish Ironmasters. The date and details will be announced later.

The Tri-City chapter of the American Society for Steel Treating will hold a dinner meeting Thursday evening, Feb. 25, at the Davenport Chamber of Commerce, Davenport, Iowa. "The Art of Cold Heading" will be the subject of an address by Swan Hillman, metallurgist National Lock Co., Rockford, Ill.

Of the Italian imports of agricultural machinery during the first half of 1925, Germany supplied 52 per cent, or 4348 metric tons, according to Trade Commissioner Pilger, Berlin. During the corresponding period of 1924, Germany supplied 43 per cent of the Italian imports of this class.

Recommend New Economic Bureau

To Operate Within Bureau of Mines and Function with Regard to Conservation of Mineral Resources

WASHINGTON, Feb. 16.—Incorporation of a branch of economics within the Bureau of Mines is one of the recommendations made in connection with reorganization of the Bureau of Mines, Department of Commerce, by an advisory committee of the bureau which has just submitted its unanimous report to Secretary of Commerce Herbert Hoover. Secretary Hoover is withholding comment on the report until he has an opportunity to review the recommendations. The committee includes John V. W. Reynnders, chairman; C. P. White, F. P. Hanaway, D. M. Folsom, Louis S. Gates, J. G. Bradley and H. Foster Bain.

Underlying the purpose of the recommendation is the elimination of waste, and conservation of minerals used as fuels and of metals and non-metals.

Making the point that careful thought must be given to elimination of waste in the mineral industries if the future is to be safeguarded, the report sets forth the fact that the output of pig iron has increased seventeen-fold in the United States in the past 50 years, of coal fourteenfold, of copper thirty-sixfold, and of petroleum one hundred and tenfold. To supply the demand for the various minerals, it is stated, the output must be doubled every 10 or 20 years.

The report declares it will not be satisfactory to attempt to segregate economic studies entirely from the technologic and engineering aspects of the mineral in-

dustries. Economic policy relating to minerals, it is pointed out, must be based on a wide knowledge of technical and engineering facts and conversely the direction and intensity of technical studies must be related to the economic situation in the industry.

The report says there is less duplication of work existing among the work of the Bureau of Mines and Bureau of Standards than is generally believed.

"In determining allotment of work as between Mines and Standards, one difficulty will be to throw on the Bureau of Mines responsibility for studies relating to raw and semi-finished minerals and mineral products and to preserve its character as essentially a field organization," says the report. "Testing finished materials is a function of the Bureau of Standards as is also the higher physical study of all materials to determine constants and the constitution of matter. Under existing practice the Bureau of Mines has been studying, for example, the production of iron ore and the process metallurgy of iron and steel; the Bureau of Standards has studied physical metallurgy and the specifications for iron, steel, and steel products. The correct dividing line can be easily visualized if it be remembered that Mines is concerned with processes and Standards with products."

The committee also recommends that the work of small stations of the bureau be consolidated into three units, located at Pittsburgh, Salt Lake City, and one at a point where the oil industry can be well served. It is recognized, the report says, that abandonment of the small stations will not be popular with "the politicians or heads of the institutions where the stations are now located."

Complaint Against Knife Information Bureau Dismissed

WASHINGTON, Feb. 16.—Declaring that the practices charged have been discontinued, the Federal Trade Commission, upon recommendation of its chief counsel, has dismissed its complaint against the Knife Information Bureau, Fitchburg, Mass., and others. The complaint had charged that the respondents combined to maintain a fixed uniform price at which the machine knives, paper mill bars and machine bed plates manufactured by them, were to be sold, thereby suppressing competition among the bureau's members in the sale and distribution of such products.

George Battenfield, secretary of the bureau, and the following companies were named in the commission's complaint: E. C. Atkins & Co., Indianapolis; Bailey & Blendinger Mfg. Co., Woburn, Mass.; Dilts Machine Works, Fulton, N. Y.; R. J. Dowd Knife Works, Beloit, Wis.; A. Hankey & Co., Rochdale, Mass.; D. Lovejoy & Son, Lowell, Mass.; Mack Tool Co., Rochester, N. Y.; Ohio Knife Co., Cincinnati; Shartle Brothers Machine Co., Middletown, Ohio; Simonds Saw & Steel Co., Fitchburg, Mass.; A. A. Simonds-Dayton Co., Dayton, Ohio; Taylor, Stiles & Co., Riegelsville, N. J.; Wapakoneta Machine Co., Wapakoneta, Ohio; Worden Tool Co., Cleveland; L. & I. J. White Co., Buffalo.

Interstate Rates to Warren, Pa., Upheld

WASHINGTON, Feb. 16.—Passing upon a complaint of the Hammond Iron Works, Warren, Pa., manufacturer of steel storage tanks and general steel plate work, the Interstate Commerce Commission, in a decision last week, held that interstate rates on iron and steel products from points in the Pittsburgh district, Cleveland, Youngstown, Buffalo and Claymont, Del., to Warren and Struthers, Pa., are not unreasonable or otherwise unlawful.

The No. 1 blast furnace of the Otis Steel Co., Cleveland, is to have new downcomers, primary and secondary dust catchers and a new gas main, and two Kling type goggle valves. Arthur G. McKee & Co., Cleveland, are the engineers and contractors for the work.

Dominion Alloy Steel Corporation to Increase Sheet Capacity

TORONTO, Feb. 15.—The Dominion Alloy Steel Corporation, which completed the first unit of its plant at Sarnia, Ont., and produced its first galvanized sheet last May, has experienced success since that time both as regards production and the sale of its products. The company now has under consideration a second unit, which will be established in the present building. The next step is to complete a plant for the production of black sheets to supply material for the galvanizing department. Some of the equipment for the black sheet mill has already been installed and the company, according to W. B. Boyd, president, has sufficient cash on hand to complete the equipment of this mill, and it is expected that it will be in operation before the end of June.

The new sheet mill will have a capacity of 30,000 tons annually and the galvanizing shop will require at least 40 per cent of the output. In order to put the sheet mill in operation further equipment required will consist of one large motor, hot rolls, re-heating furnaces, annealing boxes and shears. After this plant has been put in operation, the next step will be to erect and equip a bar mill after which it is proposed to install open-hearth furnaces. These latter units, however, are not proposed to be undertaken until the sheet mills are operating on a profitable basis.

Record Construction Volume Continues

Construction contracts awarded in January in the 37 States east of the Rocky Mountains totaled \$457,158,600, according to data gathered by F. W. Dodge Corporation. This is the highest figure ever recorded for the opening month of a year. Included in the total was \$50,000,000 for a power plant in New York, bringing the January figure for New York to one-third of the total for the 37 States.

Residential buildings continue to lead, with \$190,847,000 or 42 per cent of all construction. This amount is more than double that of industrial buildings and power plants, in second place with \$94,676,500, or 21 per cent. Commercial buildings absorbed \$71,321,700 and public works and utilities, \$52,922,200.

Pollack Chicago Plant Merged with Standard Forging Co.

The drop forging and axle plant of the Pollack Steel Co. at Chicago has been merged with the Standard Forging Co., Chicago, according to an announcement made by officials of the former concern. The combination will be known as the Standard Forging Co. Officers of the Pollack Steel Co. will retain a large financial interest in the new company which started operations on Feb. 15.

The Cincinnati and Marion, Ohio, plants of the Pollack Steel Co. are not affected by the merger and will continue to produce forgings and rail steel bars.

Pittsburgh Products Exhibited

"Let's Know Pittsburgh," sponsored by the Chamber of Commerce of Pittsburgh, is being featured by an exposition of the products of the Pittsburgh district, at 311 Ross Street, which opened Feb. 13 and is to run until Feb. 27. About 7000 sq. ft. is occupied by exhibits of different companies, while a portion of the lobby of the William Penn Hotel is similarly engaged, in a display of the products of the subsidiaries of the United States Steel Corporation.

Among the exhibitors at 311 Ross Street are the following:

Air Reduction Sales Co.; Graham Bolt & Nut Co.; George J. Hagan Co.; Homestead Valve Mfg. Co.; Homestead, Pa.; Jones & Laughlin Steel Corporation; William Leard Co., New Brighton, Pa.; McKenna Brass & Mfg. Co.; Mellon Institute of Industrial Research of Pittsburgh; Oliver Iron & Steel Corporation; Phillips Mine & Mill Supply Co.; Pittsburgh Electric Furnace Corporation; Pittsburgh Testing Laboratory; Pittsburgh Valve Foundry & Construction Co., Sommerville Co.; Standard Sanitary Mfg. Co.; Stove & Range Co. of Pittsburgh; Union Screw & Mfg. Co.; United States Bureau of Mines and Westinghouse Electric & Mfg. Co.

The companies contributing to the Steel Corporation

exhibit are the Carnegie Steel Co., National Tube Co., American Bridge Co., Lorain Steel Co., American Sheet & Tin Plate Co., American Steel & Wire Co. and the Universal Portland Cement Co. The display of the American Steel & Wire Co. is particularly interesting as it embraces almost all of the products of that company. The rolled sections of the Carnegie Steel Co. are shown in cases, the various kinds of tubular products of the National Tube Co. are shown in sample and the American Sheet & Tin Plate Co. is showing black, galvanized and full finished sheets and coke and charcoal tin plate and terne plate.

Treatment of High-Phosphorus, Low-Sulphur, Manganiferous Pig Iron

The dependence of the United State on imported high-grade manganese ores and manganese alloys is fully realized by steel makers and other users of manganese. Normally the high-grade manganese ore produced in this country constitutes less than 2 per cent of the total amount of manganese consumed. If the importation of high-grade manganese ore and the alloys produced therefrom were discontinued, numerous industries would be vitally affected. Of these the steel industry consumes by far the largest amount of manganese.

As a part of its experimental blast furnace studies, the United States Bureau of Mines has produced about 136 tons of an alloy containing from 5 to 15 per cent manganese and averaging about 0.6 per cent phosphorus. It is the scope of this investigation to determine whether metallurgical treatment can be developed whereby it will be possible to separate the iron, manganese and phosphorus. Preliminary tests indicate the iron can be reclaimed in the form of steel containing negligible amounts of sulphur. The manganese will be converted into an oxide and recovered in a slag which can be used as an artificial ore in the production of ferromanganese. This last phase of the work is the primary purpose of the investigation.

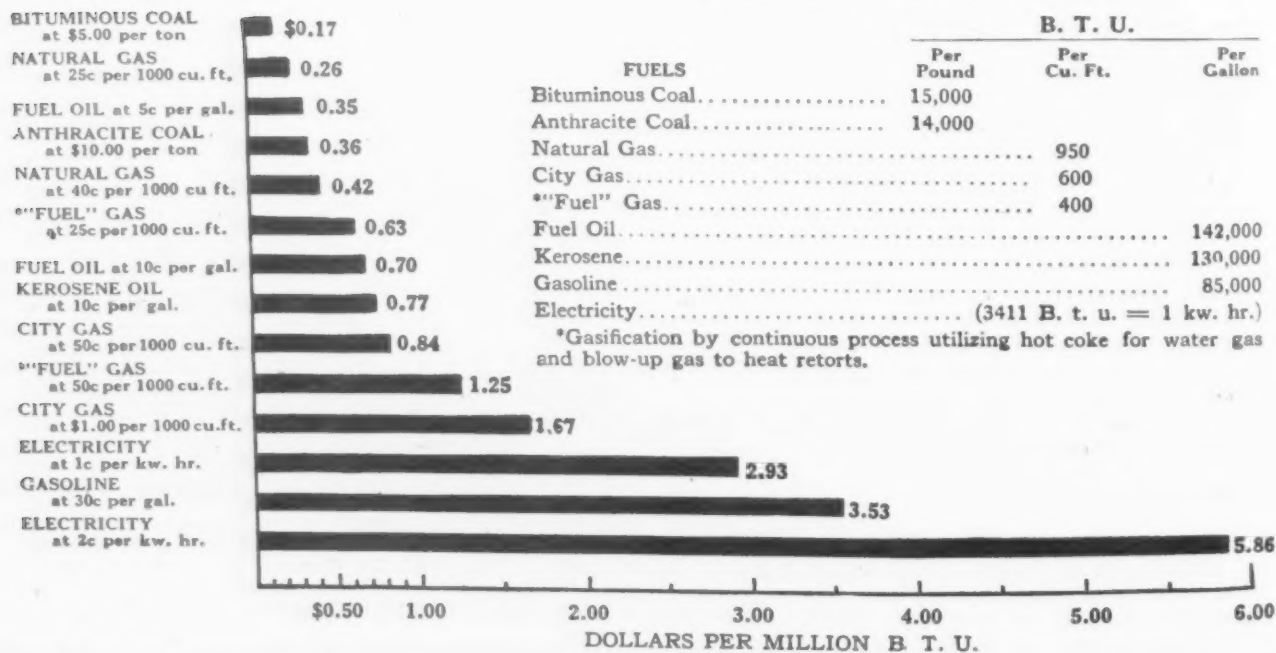
Selection of Fuel for Heat Treatment of Metals

Comparative Cost, at Unit Prices, Per Million B. T. U.

While cost per million B.t.u. is not the only factor to be considered in connection with fuels for heat treatment, it nevertheless has an important place. W. S. Rockwell Co., 50 Church Street, New York, has put out, in Technical Paper No. 269, a comparison of 14 fuels as shown in the accompanying diagram, which was

taken from that paper. This covers the comparative cost at assumed unit prices and assumed B.t.u. per unit of consumption of fuel. The paper covers a good deal besides the fuel cost, for it is recognized that furnace design and many other elements are a part of the same story.

Assumed Thermal Value



MINING ENGINEERS

New Metallurgical Developments in Important Field Feature Annual Meeting

Metallography, the hardness of metals, delta iron and open-hearth furnace practice were the leading features of the iron and steel sessions of the 133d meeting of the American Institute of Mining and Metallurgical Engineers, New York, this week, Feb. 15 to 18. Some of the papers were notable in the new developments made public, particularly in metallography.

An unusually varied program was presented at the four sessions of the Institute of Metals Division of the mining engineers. Two were devoted largely to copper, one to aluminum and another to miscellaneous metals. The attendance at all the technical sessions was large and was featured by the presence of many leading authorities in the steel and non-ferrous fields. Features of the papers and discussions at these sessions will be published in THE IRON AGE, Feb. 25.

The third annual Henry M. Howe memorial lecture was delivered Monday afternoon, Feb. 15, by Dr. William Campbell, Howe professor of metallurgy, Columbia University, New York. Taking as his subject, "Twenty-five Years in Metallography," Doctor Campbell traced the developments from the early incep-

tion of this new art to the present time, illustrating his remarks with a large number of slides.

"The Relation Between Metallurgy and Atomic Structure" was the title of the third annual lecture under the auspices of the Institute of Metals Division, which was delivered by Dr. Paul D. Foote, physicist, Bureau of Standards, Washington.

The new president of the institute, who was elected at the annual business meeting Tuesday morning, Feb. 16, is Samuel A. Taylor, consulting engineer, Pittsburgh.

An innovation in the program was a session devoted to non-metallic minerals, at which several important papers on sands, including both molding and special sands, as well as one on magnesite and magnesia were presented. At one of the coal sessions a paper entitled "Evaluation of Coal," by Ralph H. Sweetser, American Rolling Mill Co., Columbus, Ohio, gave rise to a spirited discussion because of the author's presentation of a method of stabilizing and systematizing prices of bituminous coal.

The Institute of Metals Division gathered at the Harvard Club, Tuesday evening, for its usual dinner and business meeting, at which nearly 100 were present. One of the entertainment features of the convention was a largely attended smoker at the spacious rooms of Mecca Temple, New York, Monday evening, Feb. 15.

Tentative Standard for Plow Bolts

After several meetings throughout the country and after the preparation of numerous drafts, a tentative standard for plow bolts has been completed by subcommittee No. 6 of the sectional committee on the standardization of bolt, nut and rivet proportions. The sectional committee, which consists of 49 members representing 20 organizations, was organized in 1922 by the Society of Automotive Engineers and the American Society of Mechanical Engineers acting as joint sponsors under the procedure of the American Engineering Standards Committee.

The work of the committee has been coordinated with that of a standardization program being carried out by a committee of the National Association of Farm Equipment Manufacturers. After reviewing the large variety of plow bolts now in use, the committee of the farm equipment manufacturers selected seven types representing 182 varieties. From these seven types, four types of plow bolts, representing 42 varieties, were finally selected as sufficient to meet the demands of the trade. This reduction was accomplished by combining on the angles of the head, thickness of the head and other dimensions of the original large variety. The four types retained were approved by a conference called Feb. 19, 1924, by the division of simplified practice of the Department of Commerce, which conference was attended by the representatives of both committees. These four types are: No. 3 round countersunk short square type; No. 4 square head countersunk type; No. 6 heavy key round head countersunk type; and No. 7 reverse key round head countersunk type.

The No. 3 round countersunk short square type of plow bolt is used in steel parts where countersinking the holes is necessary, and also to some extent where the hole can be either dry sand or green sand cored. With an included angle of the head of 80 deg., the hole can be countersunk conveniently leaving a sufficiently strong head without too much top surface which might be objectionable in soft center moldboards where scouring is essential. The No. 4 square head countersunk type of bolt is used only in cast iron or malleable parts, where the hole is green sand cored. The head with the 80 deg. angle is rather flat and, therefore, is desirable for use in cast shares that are very often quite thin. The No. 6 heavy key round head countersunk type bolt is used in chilled and cast moldboards where the holes are always dry sand cored. It has a 40 deg. angle of head.

The No. 7 reverse key round head countersunk bolt is for steel parts. The key on this bolt being larger on the bottom makes it desirable for parts of plows such as the moldboard for the reason that the head can wear down with the surface of the board without wearing away the entire key. The key does not extend outside of the top portion of the bolt. The 60 deg. angle on this bolt is thought to make it desirable for plow bottom work as the head is not any larger than necessary.

The threaded parts of these four standard plow bolts are to conform to the American Standard coarse-thread series—free fit (Class 2). Copies of the standards may be obtained from C. B. LePage, assistant secretary of the A. S. M. E., 29 West Thirty-ninth Street, New York. The standard is in tentative form and criticism will be welcome.

Hearings on Aluminum Company Case

PITTSBURGH, Feb. 16.—Hearings in the Federal Trade Commission action against the Aluminum Company of America started here yesterday before Examiner W. W. Sheppard. George R. Gibbons, vice-president and secretary of the company was on the stand yesterday and again today and it was believed his testimony would take up the remainder of the week. Attorney R. P. Whitely, is conducting the case for the commission and will attempt to prove charges that the company has violated section 2 of the Clayton law relative to price discrimination, has used unfair methods in dealing with competition and has employed practices that violate section 5 of the Federal Trade Commission law.

A dispute arose over a demand by Mr. Whitely that Mr. Gibbons produce a list of stockholders owning more than 3 per cent of the company's stock. Examiner Sheppard at first sustained the objection of W. W. Smith, counsel of the company, but later ruled in favor of Mr. Whitely when the latter explained that the purpose of having the list was to find out what power the smaller stockholders might possess to harass the company's competitors. He mentioned the possibility of bankers with small holdings of aluminum stock denying credit to competing companies. Mr. Gibbons's testimony had to do with the makeup of the company, its sources of raw material and its process of manufacture.

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Anthracite Strike Settlement

IF the anthracite coal strike settlement gained much for anybody, it must be Mr. Public who won. The operators appear to have achieved, not arbitration in name, but close to it in effect. What special concession was obtained by the miners is difficult to see. If the consuming public had not been subjected to annoyance and expense, if general business had not been unduly dislocated, and if want and ruin had not been brought to the communities dependent on anthracite mining, it would be in order to dwell on the ridiculous situation of reaching an agreement which left the parties immediately concerned substantially where they were before the outbreak, four and one-half months ago.

The right to strike did not come in for a ruling. So, while on the face of it a simple piece of machinery has been designed to take care of recurring controversies, the public will wait and see. It will hope for the best, that the agreement will do what it essays to do.

Where the public gained this time is in the implied promise of no more strikes for nearly five years. Also it found itself brought into unusually distinct relief as the commonly neglected third party to a strike; and more is bound to be heard in the future of the triangle of interests in any strike. In particular, it showed it did not propose to get panicky and beseech for governmental interference, but, presenting a remarkable front of indifference, took up substitutes, some of which will be permanently retained.

As to who and what brought about the end, the last has not been written. We accept R. F. Grant, vice-president, M. A. Hanna Co., as the conspicuous man of the hour; that he seized on a psychological moment to bring together the opposing word-weary groups; that Presidential refusal to act directly was a factor, as was the remote likelihood of special Congressional action. Fears of drastic legislation or of legislation mildly favorable to government regulation or management had no apparent bearing on finally hastening the result. As Mr. Grant put it: "My only fear was that some great friend of

the people would have a heart-break and start loving out loud and spoil the party."

As implied at the beginning, the results would leave one wondering what the strike accomplished. On the face of things as now known, the position of the leader of the miners is weakened, and this fact and the disasters in the anthracite regions are as good a safeguard as any that the public will not soon again be harassed by a coal upset.

Steel Price Ranges

DESPITE the very great changes that have occurred in the steel trade in recent years, there is persistence in some quarters of the idea that a given mill product should be at a fixed price to all buyers. This notion has been in very considerable measure responsible for the unsatisfactory condition of prices of many finished steel products in the past two years and more.

An individual buyer learns that steel in a certain case has sold at such and such a price and promptly assumes that he is entitled to the same price. Yet that is not the case with commodity markets in general. Usually there are various considerations dictating the price in the case of a given sale, the quantity involved in the individual order, the regularity of the trade, the relations previously existing between the buyer and seller, and various other considerations.

The vogue of this one-price idea in steel at the present time is due to a memory of much older times. Since those times conditions have changed and it requires a consideration of those changes to eradicate the notion and put the steel market where it belongs as an ordinary trading proposition.

It is a memory of the old days when the contract system was the method of transacting nearly all steel business. There may have been much good in the system but there was also much harm. It is not to the point to discuss that in this connection, the compelling fact being simply that the system has disappeared, and its accompaniment of one price to all, or nearly that, naturally should

likewise disappear. It was an artificial system and when there is a natural market nothing of an artificial nature should prevail, particularly so when merely a habit is represented.

In the old days contracting went by quarters, several quarters being sometimes accumulated on contract books. When business was done so far ahead distinctions could not well be made. The unit was simply the lump tonnage the buyer thought he might have occasion to take in the quarter involved. The matter of character of specifications, or tonnage in individual shipping orders, commonly did not enter.

Today steel business is done in an entirely different way. The mill knows in most cases just what is involved in the order, what the specifications are and how rolling schedules can be arranged. Some of the business is much more profitable, or much more easily handled, than other business. It is natural that there should be differences in prices. In a natural market the one price idea applies to orders of similar character, and circumstances substantially identical in all respects. In any finished steel product the total of a year's business will divide itself into many classes according to these circumstances. Differences in prices are both fair and natural.

When, therefore, the general market in a given steel product is quoted at a range it should be recognized by buyers and sellers alike, for sellers themselves are not always clear in the matter, that the range is due to varying conditions as to individual pieces of business and rests upon reasonable and proper considerations.

"Unfilled Tonnage" in Steel

USEFULNESS of the Steel Corporation's monthly statement of unfilled obligations to the individual observer is measured by his understanding of the circumstances. Too often the statement is treated by financial and other observers as a direct measure of industrial conditions and prospects, not requiring allowance of any sort to be made. To the class indicated, all "gains" are considered simply good and all "losses" are considered simply bad.

More allowance should be made for the fact that the unfilled tonnage cannot be always increasing or always decreasing. Necessarily there are alternations. By actual count, indeed, in the seven calendar years since the war, there have been eight periods of decreases and eight periods of increases, or, so to speak, eight round trips, the decrease reported for last month representing the beginning of a ninth round trip since the war. In two instances there were increases for only a single month at a time, while there were three cases of decreases being reported only for two successive months.

The very wide variety of business that enters into the statement of unfilled obligations is appreciated only in the steel industry itself. In the first place, steel is practically ubiquitous, but while it goes into almost all lines of industrial activity it does not follow that it goes in equal proportions. The case is indeed very different.

If industrial activity is measured by dollars of expenditure, the proportion of the dollar that goes into steel varies widely. It is high in freight car building and low in road building. If industrial activity be measured by labor employment similar wide variations are found, in the quantity of steel consumption per man employed.

Then, along another line, there is need for intelligent consideration of "unfilled tonnage" figures in that there are different practices, whether from habit or from the natural exigencies of the case, in the manner of buying steel. Late in a given year the railroads place orders to cover rail replacements in the following year. This is practically annual business, and there is no other annual business of consequence. Many years ago merchant bars for agricultural implement making were contracted for annually, but that is no longer the case. Later, but still not a few years ago, tin plate ceased to be annual. Some large lots of construction steel are bought for work that will require many months to complete, while on the other hand steel for some manufacturing operations is bought scarcely more than a few days before the actual consumption.

In still another way the variations in "unfilled tonnage" may be misinterpreted. In some quarters all "gains" are considered good and all "losses" are considered bad, directly in proportion to their extent. The steel industry knows quite well that its shipments are a much better indication of its position than is the tonnage which it does not ship. In a given month heavy shipments tend to decrease the unfilled obligations and light shipments the reverse. If dividends are made it is by the tons that customers permit to be shipped, not the tons they defer taking, but some references to the "unfilled tonnage" would indicate a different belief or the absence of any thought at all.

The Demand of Railroad Labor

WHAT we have frequently characterized as the unbalance in the division of the product of industry, or else as the maldivision, and whither it points economically, are clearly illustrated in the approaching demand of the railroad trainmen for increase of wages. It does not follow, as some of our contemporaries are representing, that if the trainmen should get what they want, the other branches of railroad workers would win equivalent demands, which would raise the annual wage bill of the railroads by 500 million dollars. That idea reflects one of the faults of general averages.

Railroad labor is capable of sharp subdivision into train service, maintenance service and all other. Now while it is true that in recent years the remuneration of railroad labor as a whole has been supernormal, and at present is so, it is also true that the wage rate of the trainmen has indicially lagged behind the general average. Hence the coming demand for increase. This is the natural consequence of unbalance. The wage-earner aims to bring everything into balance, but instead of thinking of balancing with the general economic index he aims to get in balance with the highest

that any class has secured, which is an economic impossibility.

At present the railroads of the United States as a whole are earning a net of 4.83 per cent on their own book value and 5.5 per cent on the arbitrary valuation of the Interstate Commerce Commission, which is greatly underrated in terms of pre-war dollar and is but little more than one-half what it would be in current dollars, i. e. reproduction value that the courts have lately declared repeatedly to be the proper basis for computing public utility return. The railroads, more than any other great industry, have improved their economy, i. e., production per man, giving labor the benefit of good management, which is all that American labor, strongly non-socialistic, in theory claims as labor's right.

If the trainmen should now get any increase, large or small, from where could it flow? From the share of the stockholders, which is already trimmed very low? From the pockets of shippers and passengers, to whom rates have already been run very high? From one or the other of those parties it must necessarily come. Management has even now strained itself to the utmost and is not immediately capable of laying any more golden eggs.

PRODUCTION of domestic ferromanganese in January was unusually heavy. At 29,129 gross tons it was the largest since July, 1920, as ascertained from the blast furnace statistics of THE IRON AGE. Following a 20,000-ton per month average for 22 months previous to November of last year, production suddenly expanded and in the last three months has averaged close to 27,000 tons. The large steel output of the country does not give the reason. In 1923 and 1925, years of high steel output, ferromanganese production was at the 20,000 tons per month rate. The cause lies rather in an evident intention of domestic makers to supply a larger share of American consumption. With foreign competition accentuated recently by the offerings of electrically made alloy, the fact is all the more interesting, particularly in respect to what may happen to prices.

JANUARY provided the fifth largest monthly tonnage of steel ingots ever made in the United States. Only in May, 1923, March, 1924, and January and March, 1925, was its record of 4,153,545 tons exceeded. On the basis of average production per working day the record is still better. At 159,752 tons, January has been exceeded only twice—by 161,796 tons in March, 1924, and by 161,482 tons in March, 1925. Pig iron production in January seems to have reached a peak, with lower daily figures probable for February. The same deduction cannot be made for steel, on the basis of present knowledge.

The Society of Industrial Engineers will hold its thirteenth national convention in Philadelphia, June 16, 17 and 18 at the Bellevue-Stratford Hotel. Papers and discussions will deal with practical methods for eliminating waste. The program is being arranged to cover all departments of a manufacturing business. The meetings will be open to the public. George C. Dent, 608 South Dearborn Street, Chicago, is executive secretary of the society.

CORRESPONDENCE

Refractories for the Open-Hearth

To the Editor: I have read with a great deal of interest the article entitled "Refractories for the Open-Hearth" which appeared in your issue of Dec. 24, 1925. The work reported appears to have been very carefully done and the results are of considerable value.

With regard to the suggested specifications, however, it appears to me not quite fair that the chemical analysis should be limited as indicated. I refer particularly to the figure, given for lime content, which is specified as "below 5 per cent." Experiments now under way by the National Research Council indicate that perfectly satisfactory magnesite brick can be made with a considerably higher percentage of lime than the figure given, and we understand that equally good results have been obtained by other parties.

There is certainly nothing in the work reported which suggests that the analysis of the brick should be kept within the limits mentioned. It appears to us that, while it is permissible to make the specifications for service as strict as necessary, it seems hardly fair to the manufacturers to impose restrictions as to the analysis, particularly where such restrictions are based upon the general opinion of the trade rather than upon reliable scientific tests.

F. E. LATHE,

Technical assistant to the president,
National Research Council (Canada),
Ottawa, Ont., Feb. 16.

What Ails the Western Farmer

To the Editor: Your article entitled, "What Ails the Western Farmer," appearing in the Feb. 4 issue has proved very interesting, but has aroused to expression the logical opposition one must feel who is familiar with actual conditions as they exist. This familiarity is based upon 30 years' close contact with the situation, a great portion of which has been spent in the midst of true Western farming operations. It is also occasioned by 12 or 15 years' association with industrial activities in all its economic phases.

Opposition to Road Construction Programs

It is agreed that present difficulties experienced by agriculturists are due to their own shortcomings, but not from causes given in your article. The farmers, as a whole, have never approved or even suggested that improved roads be constructed—in fact, a majority are distinctly opposed to any program of road improvement as has been suggested by urban and political forces. They early realized such would place obligations upon them which could never be fulfilled and consequently wreck the economic basis for all prosperity in the United States.

Your publication with other organizations must sooner or later realize that back of all activity in this country is the lowly tiller of the soil, who provides you and me with subsistence, and unless those individuals and their communities prosper, all other effort is for naught. The fundamental economic law governs this condition, that of each being dependent on the other.

The automobile, you appreciate, is becoming more and more a necessity, and most farmers are as well qualified to possess machines as our common laboring population in the cities. From a standpoint of convenience, it is much more a necessity for the country dweller, as it provides a means of expeditious transport to centers of trade. Furthermore, the cheapest class of machine is usually purchased, which bespeaks an attempt at economy. With these conditions the farmer's automobile is justified.

By a long discussion it may be proved that without the farmers' acceptance of modern tools and methods, we would not, as a nation, have progressed to our present high state. You are referred to our European neighbors for confirmation of this statement. Inciden-

tally, the farmer has always been conservative and has indirectly opposed purchases of modern machinery because of his limited capital. The automobile may rightfully be classified as an up-to-date necessity.

Now Visualizing Need of Organization

With reference to restoration of losses suffered, the farming population is not demanding such but merely insisting upon no recurrence of conditions which have existed. The mouthpiece of these people has been through political men, such as Brookhart, LaFollette, etc., and their methods have been, perhaps, inclined toward radicalism. However, it has been necessary, probably, to resort to such methods to overcome the evil which has existed. This evil originated because farmers failed to visualize the necessity for organization as well as scheduling, planning and budgeting their activities. Therein lie the shortcomings of our agricultural situation and not because of some misdemeanor on their part.

The farmers have been individualists and are only recently realizing the advantages of combined effort.

They are now awakened and within a decade one of the most powerful organizations will take its rightful place in this country's activities and it will be composed of agricultural interests. It will demand and obtain a fair price for its products, based upon cost of production.

The other features of your articles can easily be refuted and it is suggested that you acquaint yourselves with conditions that prevail and not arrive at conclusions based upon statements of men who have never followed a plow, or known the sweat of honest toil on their brow, caused by grubbing in old Mother Earth to eke out a bare existence in accordance with the so-called law of supply and demand regulated by the Chicago Board of Trade.

Incidentally, for your information, the writer is associated with the sales department of one of the largest steel industries of its kind in the world and fully appreciates the necessity for stable agricultural conditions before steel products can continue to be sold in great quantities.

CHARLES R. LUND.

965 Thirty-eighth Street, Milwaukee.

Illinois Roads Preparing Rates to Conform with Mileage Scale

WASHINGTON, Feb. 16.—Railroads in Illinois Classification territory have just advised the Interstate Commerce Commission that they will comply with the decision in the Jones & Laughlin Steel Corporation case without an order. These lines declared that they are working on the new rates provided under the scale set forth in that decision and that they will be put into effect as rapidly as possible. It is understood that the Illinois Classification lines said that delay in preparing the schedules was due to the attitude of Central Freight Association territory lines, which have not informed the commission, it is said, of the progress they have made in preparing the new rates. It is expected that by reason of this situation the order putting the scale into effect on a given date will be handed down soon by the commission.

Large Electrical Units

The largest Scherbius drive ever made will be installed by the McKinney Steel Co. as part of the equipment for a new 12-in. Morgan merchant mill at Cleveland, according to a statement of the General Electric Co. The new Scherbius drive will include a mill-type motor rated 5610/4500/3370 hp., 156/125/93.6 r.p.m., at 6600 volts, with a regulating set and ohmic drop exciter.

Four 800-hp., 600-volt motors with complete control equipment will be installed for driving the mill. The McKinney Steel Co. a few months ago purchased a 9000-hp. synchronous G. E. motor for driving a Morgan continuous billet mill. This is said to be the highest continuous horsepower rating of any industrial motor in the world.

Tempering Hand Drill Steel

An interesting communication to the *Engineering and Mining Journal-Press* by Albert A. Leach of the RaTor Plac Co., Tyrone, N. Mex., discusses the overcoming of certain troubles encountered in the use of hand drill steel. His opinions are as follows:

Great difficulty was experienced in tempering hand drill steel used at a prospect. Sharpening was done in a small portable forge, which was moved from place to place and set up without shelter as near to the work as possible. The drills produced by different men were all unsatisfactory, as it is difficult to judge the temperature in a bright light by the eye, and more particularly as the old-time expert miner, who was a craftsman at his trade, has become a *rara avis*. The steel was either too soft and would not stand up, or was too hard, and cracked and broke off at the bits. The fol-

lowing procedure immediately and entirely eliminated the trouble:

The drills were heated and sharpened and then allowed to cool. An ordinary magnet was then laid beside the forge (curved bar magnets from old Ford magnetos may be picked up in any garage, and were used in this case), and the steel was reheated. The drills as they warmed up were touched to the magnet from time to time, until they ceased to exhibit any attraction for it, when they were quickly thrust into the slack tub and quenched. Uniformly good results were obtained, even on a miscellaneous collection of steel, of different grades and make.

Interstate Earnings High

Net earnings of the Interstate Iron & Steel Co. for 1925 were \$963,890, or \$24.09 a share on the 40,000 shares of common stock, compared with \$395,114, or \$9.87 a share, in the previous year. According to Paul Llewellyn, president, in 1925 the tonnage produced and shipped exceeded all prior records, but the sales price per ton for the company's product was less than in any year since 1913. Costs were less, due to more efficient operation. Comparison of the income account for the two years, ended Dec. 31, follows:

	1925	1924
Net operating income.....	\$2,168,802	\$1,296,210
Less:		
Depreciation	483,523	378,104
Tax reserve	262,818	143,493
Bond interest	287,479	315,430
Bond discount	26,881	28,016
Net earnings	\$1,108,104	\$431,167
Preferred dividends.....	144,214	36,053
Earned on common.....	\$963,890	\$395,114
Per share earned.....	\$24.09	\$9.87

Higher net earnings are recorded even after payment of the regular quarterly dividends of 1% per cent on the preferred stock, while a much smaller amount was paid in 1924. In addition, the company paid 3% per cent on the accrued dividends during the year and recently the board authorized the payment of a further extra to apply on accruals of 3 per cent.

To Auction Property of Bath Iron Works

The Industrial Plants Corporation, 25 Church Street, New York, through its president, Charles Kriser, has been commissioned by the Bath Iron Works, Inc., Bath, Me., to sell its plant at public auction on March 28, 29 and 30. This consists of approximately 14 acres of land, with 1400 ft. of deep waterways, 12 steel and concrete structures, having 200,000 sq. ft. of floor space; also all of the machinery, equipment and supplies contained in this plant. Catalogs may be obtained by applying to the Industrial Plants Corporation.

Iron and Steel Markets

Pig Iron Waits on Coke Market

Settlement of Hard Coal Strike Breaks Coke Severely
—New Buying in Steel Slow—Activity
in Rails—Scrap Declines

CANCELLATIONS and suspensions of contracts for domestic coke following in a flood the settlement of the anthracite strike broke coke prices severely. By its virtual independence of the coke market, steel of course was not affected, but pig iron was weakened. A week ago the strike was thought likely to last long enough to bring higher second quarter coke and thus, in spite of the low ebb of buying, to save pig iron from a decline.

With the coke now in transit regarded as equal to Eastern demands until hard coal takes its place, some excess coke from the speeded-up Connellsville district is expected to appear on the market. Furnace coke dropped to \$5 per net ton at ovens, or less than half its price on Friday, and now blast furnaces are delaying in negotiations for the second quarter, assuming that coke operators must depend largely on metallurgical consumers.

No decisions have been announced with respect to putting into blast those furnaces which were banked when coke was diverted to the more remunerative outlets. Demand for merchant iron now remains light and needs for steel making are well satisfied.

Surplus foreign iron at Atlantic Coast ports has had a weakening effect on the Eastern markets. Chicago merchant iron has been sold at St. Louis at \$21, Chicago, a concession of \$2. Somewhat unusual is the sale of 10,000 tons of basic iron at a concession by a Pittsburgh district scrap dealer, who bought the iron some time ago on speculation.

In steel, new buying is disappointing on the whole. Its seasonal character, now accented by short range purchasing, gives no promise of an expansion before mid-March. On top of this the general storms gave a temporary setback to consumption.

Chicago and the South both report demands close to shipments and sustained high production. Elsewhere specifications and new business, while for the first half of February 20 per cent better than January, were not up to the December volume. Steel production so far has averaged about 5 per cent under January, but with some further check lately owing to the severe weather.

Demands for standard section rails on 1926 contracts show no let up and are accompanied by steady specifying of track accessories. The rail movement is largely responsible for Chicago's orders exceeding shipments. Fresh purchases covered about 65,000 tons, 51,000 tons to be rolled by Chicago mills, including 33,000 tons for the Rock Island.

Railroad equipment buying is at a low point, but several thousand cars are pending, including 1000 just inquired for by the Northern Pacific and 500 for the Burlington. The Seaboard Air Line has received bids on 3000 to 4500 cars.

Cleveland finds signs of a gain in automobile steel with larger orders for sheets and strip steel than for several weeks, but in all centers expansion of the motor car industry has been below expectations.

Counting on the coming of open weather to hasten consumption, a general condition of low stocks is the producer's support for holding prices. Sheet selling is below capacity and is weaker in that fewer of the large makers are holding to the higher prices.

Combined specifications and new orders for steel bars are not taxing production capacity, and deliveries are easier. In Cleveland a quotation of 1.90c., Pittsburgh basis, on billet steel reinforcing bars has appeared, though steel bars broadly are notably strong at 2c.

Strip makers have asked for some suspensions on billet and slab contracts, to avoid getting too far ahead on their own rolling schedules.

For an oil line in Kansas the Emerald Oil Co. is inquiring for 15,000 tons of pipe.

England will build two 10,000-ton motor-driven ships for the United States.

Further weakness in scrap has developed in nearly all consuming districts, with declines of 50c. a ton on heavy melting steel at Pittsburgh and Cleveland.

Since November, an average of heavy melting steel in Chicago, Pittsburgh and Philadelphia has lost about \$2, dropping from \$17.67 to \$15.75. This is in contrast with the movement of pig iron, which was \$21.29 through most of November and has stood at \$21.54 ever since, as shown by THE IRON AGE composite price.

Pittsburgh

Sharp Decline in Coke—Steel Output Drops Below 80 Per Cent

PITTSBURGH, Feb. 16.—In a general way the demand for steel has hardly held its own in the past week, and this has caused a further slight recession in production. In this and nearly all nearby districts the average rate of ingot output is slightly below 80 per cent. Steel manufacturers are scheduling plant operations in close conformity with actual orders. Hence, curtailment of production is to be regarded in the light of a constructive step, since a year ago maintenance of output in excess of then existing commitments proved rather disastrous to prices.

There is no doubt that weather conditions of the past few weeks have had much to do with the relatively light demand for practically all products, with the sole exception of tin plate. The urge to buy automobiles is absent with snow on the ground, and having built up

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous
For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 16, 1926	Feb. 9, 1926	Jan. 19, 1926	Feb. 17, 1925
No. 2X, Philadelphia†....	\$24.26	\$24.26	\$24.26	\$25.01
No. 2, Valley furnace†....	20.50	20.50	20.50	22.00
No. 2, Southern, Cin'tit... 25.69	25.69	25.69	25.69	24.05
No. 2, Birmingham, Ala.† 22.00	22.00	22.00	22.00	20.00
No. 2 foundry, Ch'go furn.* 23.00	23.00	23.00	23.00	24.00
Basic, del'd, eastern Pa.... 23.00	23.00	23.00	23.00	23.75
Basic, Valley furnace.... 20.00	20.00	20.00	20.00	22.00
Valley Bessemer del'd P'gh 22.76	22.76	22.76	22.76	24.26
Malleable, Chicago furn.* 23.00	23.00	23.00	23.00	24.00
Malleable, Valley..... 20.50	20.50	20.50	20.50	22.00
Gray forge, Pittsburgh.... 21.76	21.76	21.76	21.76	23.26
L. S. charcoal, Chicago.... 29.04	29.04	29.04	29.04	29.04
Ferromanganese, furnace. 115.00	115.00	115.00	115.00	115.00

Rails, Billets, etc., Per Gross Ton:

O.-h. rails, heavy, at mill..	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh...	35.00	35.00	35.00	37.00
O.-h. billets, Pittsburgh...	35.00	35.00	35.00	38.00
O.-h. sheet bars, P'gh....	36.00	36.00	36.00	38.00
Forging billets, base, P'gh 40.00	40.00	40.00	40.00	42.50
O.-h. billets, Phila.....	40.30	41.30	41.30	41.67
Wire rods, Pittsburgh....	45.00	45.00	45.00	48.00
Light rails at mill.....	36.00	36.00	36.00	40.32
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb..	1.90	1.90	1.90	2.10

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.22	2.22	2.22	2.28
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh....	2.00	2.00	2.00	2.10
Steel bars, Chicago.....	2.10	2.10	2.10	2.20
Steel bars, New York....	2.34	2.34	2.34	2.44
Tank plates, Pittsburgh...	1.80	1.80	1.85	2.00
Tank plates, Chicago....	2.10	2.10	2.10	2.30
Tank plates, New York...	2.09	2.09	2.09	2.34
Beams, Pittsburgh.....	1.90	1.90	1.90	2.10
Beams, Chicago.....	2.10	2.10	2.10	2.30
Beams, New York.....	2.24	2.24	2.24	2.44
Steel hoops, Pittsburgh...	2.50	2.50	2.50	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Feb. 16, 1926	Feb. 9, 1926	Jan. 19, 1926	Feb. 17, 1925
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh 3.25	3.25	3.25	3.35	3.50
Sheets, black, No. 28, Chi- 3.45	3.45	3.45	3.45	3.70
cago dist. mill.....	4.50	4.50	4.60	4.75
Sheets, galv., No. 28, P'gh 4.70	4.70	4.70	4.70	4.85
Sheets, galv., No. 28, Chi- 2.50	2.50	2.50	2.50	2.70
cago dist. mill.....	2.60	2.60	2.60	2.80
Sheets, blue, 9 & 10, P'gh 2.65	2.65	2.65	2.65	2.85
Sheets, blue, 9 & 10, Chi- 2.70	2.70	2.70	2.70	2.95
cago dist. mill.....	2.50	2.50	2.50	2.60
Wire nails, Pittsburgh....	2.55	2.55	2.55	2.70
Wire nails, Chicago dist. 3.35	3.35	3.35	3.35	3.55
mill.....	3.40	3.40	3.40	3.65
Plain wire, Pittsburgh....	\$5.50	\$5.50	\$5.50	\$5.50
Plain wire, Chicago dist. 2.55	2.55	2.55	2.55	2.70
mill.....	3.35	3.35	3.35	3.55
Barbed wire, galv., P'gh.. 3.40	3.40	3.40	3.40	3.65
Barbed wire, galv., Chi- 2.70	2.70	2.70	2.70	2.90
cago dist. mill.....	12.75	12.75	13.50	16.50
Tin plate, 100 lb. box, P'gh	12.75	12.75	13.50	16.50

Old Material, Per Gross Ton:

Carwheels, Chicago.....	\$17.00	\$17.00	\$18.00	\$19.50
Carwheels, Philadelphia..	17.50	17.50	18.00	19.50
Heavy steel scrap, P'gh..	17.50	17.50	18.50	19.00
Heavy steel scrap, Phila..	16.00	16.00	17.00	17.50
Heavy steel scrap, Ch'go..	13.75	13.75	15.25	18.00
No. 1 cast, Pittsburgh....	17.00	17.00	17.50	20.50
No. 1 cast, Philadelphia..	17.50	18.00	18.50	19.00
No. 1 cast, Ch'go (net ton) 17.00	17.00	17.00	17.00	19.00
No. 1 RR. wrot., Phila..	17.50	18.00	18.50	20.00
No. 1 RR. wrot. Ch'go (net) 12.75	12.75	12.75	13.50	16.50

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt....	\$5.00	\$10.50	\$9.00	\$3.50
Foundry coke, prompt....	6.00	11.50	9.00	4.25

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	14.50	14.50	14.12½	15.00
Electrolytic copper, refinery 14.12½	14.12½	14.00	13.75	14.50
Zinc, St. Louis.....	7.75	8.07½	8.32½	7.55
Zinc, New York.....	8.10	8.42½	8.67½	7.90
Lead, St. Louis.....	9.00	9.12½	9.00	9.12½
Lead, New York.....	9.15	9.25	9.25	9.40
Tin (Strait), New York....	64.25	63.50	61.75	57.12½
Antimony (Asiatic), N. Y.	21.37½	21.50	23.00	21.50

THE IRON AGE Composite Prices

Finished Steel

Feb. 16, 1926, 2.424c. Per Lb.

One week ago.....	2.424c.
One month ago.....	2.446c.
One year ago.....	2.546c.
10-year pre-war average.....	1.689c.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

	High		Low	
1925	2.560c.,	Jan. 6	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15	2.460c.,	Oct. 14
1923	2.824c.,	April 24	2.446c.,	Jan. 2

Pig Iron

Feb. 16, 1926, \$21.54 Per Gross Ton

One week ago.....	\$21.54
One month ago.....	21.54
One year ago.....	22.50
10-year pre-war average.....	15.72

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

	High		Low	
1925	\$22.50,	Jan. 13	\$18.96,	July 7
1924	22.88,	Feb. 26	19.21,	Nov. 3
1923	30.86,	March 20	20.77,	Nov. 20

fairly large stocks of cars against spring demands, the automobile manufacturers have been slow to get into production. The weather also has been unfavorable for outdoor work, and as buying of steel this year has been short ranged, as it was over much of 1925, it is not believed that stocks in second hands are at all sizable. Looking at the situation from this angle, it is not surprising that there is common expectation of materially better demand with more open weather.

With the exception of sheets, prices of finished steel products are holding well. While releases of sheet ton-nages from the automobile industry are somewhat heavier, they are still far below expectations or the capacity of the producers. In the common finishes,

production generally is in excess of the present demand and prices continue to soften. Only a few of the larger makers are now adhering strictly to the prices announced late last November, and prices \$1 to \$2 a ton lower represent the prevailing market.

The sudden ending of the anthracite strike has been followed by a sharp decline in coke prices, and this development has changed the complexion of the pig iron market. A week ago it appeared that the hard coal tie-up would last long enough and keep coke high enough to have some influence on the prices of second quarter metallurgical coke. At that time there seemed to be some prospect for an advance in pig iron, but with coke selling at less than half the price it com-

manded a week ago and likely to go even lower, it is now feared that some difficulty may be experienced in maintaining even today's prices. Iron prices really are nominal because there is almost no trading. The scrap market continues to weaken because consumers are not buying and dealers with short contracts to cover, not being pressed for deliveries, are not purchasing actively against them.

Pig Iron.—The possibility of higher prices for pig iron appears to have passed with the termination of the anthracite suspension and the attendant sharp decline in coke prices. Any fear that buyers might have had about higher prices on second quarter tonnages because of high fuel costs has subsided, and it now looks as though they might defer purchases until the market becomes clearly defined on second quarter tonnages of coke. No change can be made in prices this week, but the undertone of the market is hardly as strong as it was a week ago, and the fact that scrap iron dealers who had been carrying some pig iron since early in 1923 have been liquidating remaining stocks at low prices is not helpful to the general situation. One report has it that a scrap dealer recently disposed of about 10,000 tons of basic iron at a price figuring back to about \$18.25, Valley. No such price can now be obtained, but the purchase takes the buyer out of the market to the extent of that sale. Stocks of iron in the hands of scrap dealers are now believed to be fairly well liquidated, but the market is not yet entirely free from such resale offerings. The end of the hard coal strike and the passing of high prices for coke creates an interesting question as to whether the blast furnaces, which were banked to release coke for domestic purposes, will now be put back into production or remain banked. It seems more likely that this capacity will remain out of production for the present, because the demand for merchant iron is light and the iron is not needed for steel making at present.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$20.00
Bessemer	21.00
Gray forge	20.00
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.50
Low phosphorus, copper free.....	\$28.00 to 28.50

Ferroalloys.—Ferromanganese prices are holding in this market despite a moderate demand and some effort on the part of German producers to secure business. The latter are asking consumers to make bids. A sale of 250 tons of 16 to 19 per cent spiegeleisen is noted for early shipment. The inquiry called for material of higher manganese content, but makers had none to offer for shipment before July 1. Users are specifying well against contracts for spiegeleisen and high grade ferrosilicon, but current demands amount to little because consumers are so well covered by contracts. The market does not seem able to support a price of \$1.20 per lb. contained metal on ferrotungsten, which is more of a negotiation than a sales price. Prices are given on page 515.

Semi-Finished Steel.—There is little or no demand for spot tonnages of billets, slabs and sheet bars because non-integrated mills are getting ample supplies in shipments on contracts and the demand for the finished products has not assumed proportions necessitating supplementary purchases. In fact, some of the strip makers are asking for suspensions because their stocks of billets and slabs were getting a little too far ahead of the rolling schedules. There are reports that one maker has been offering sheet bars at \$35 for early delivery, and with plates selling as low as \$36 per net ton in desirable tonnages, there are some makers who would prefer slab business at \$35 per gross ton. Most producers are holding to the bases for first quarter business, or \$35, Pittsburgh or Youngstown, for large billets and slabs and \$36 for sheet bars and small billets and slabs. Nothing yet has been said about second quarter prices, but it is believed the effort will be to continue first quarter quotations. Wire rods are moving steadily, but demands are not taxing the

productive capacity of makers. Skelp is easy. Prices are given on page 515.

Wire Products.—The more common report this week about business is one of improvement, nails being mentioned as moving with much greater freedom than recently. Jobbers appear to be preparing for the spring demands to some extent, but there is not the activity in this direction there was a year ago. Prices show no sign of changing and the ability of manufacturers to supply all demands with great promptness also is a factor in restricting a large stocking movement. Prices are holding well, but are not advancing, since manufacturers are renewing expiring contracts at recent prices. They are given on page 513.

Rails and Track Supplies.—There is no let-up in the movement of standard rails on 1926 contracts, and the specifications for track accessories also are being made steadily. Strictly new business in the accessories, however, has been moderate. Light rails are not moving with much snap, and there is a good deal of competition for passing business. Settlement of the hard coal strike is expected to bring some demand from the anthracite district, but it will probably mean less soft coal production and a lighter demand from that direction. Prices are given on page 513.

Tubular Goods.—There has not been much, if any, expansion in pipe mill operations, but as a guide to business in pipe the mill operations are a little misleading, as mill stocks are large and a good many demands can be supplied from these reserves. Actually, business is looking up, notably in oil country goods, demand for which is being helped by the decline in oil production and the upward trend of oil prices, the past week having been marked by an advance of 25c. per bbl. in Pennsylvania grade. It looks as though drilling would be more active this coming spring than it has been before since the early part of 1925. The Emerald Oil Co. is in the market for a line for Kansas calling for approximately 15,000 tons. Standard pipe is moving steadily. Mill prices are holding well despite some weakness in the secondary markets. Efforts by buyers to force boiler tube prices below current levels are meeting with some resistance from producers, but efforts of the latter to stiffen prices are likewise unsuccessful. Discounts are given on page 513.

Tin Plate.—Container manufacturers are still taking tin plate freely and mills in this and nearby districts have seldom or ever had fuller operation at this time of year. Bright as the situation looks, however, there is full realization that much of the tin plate taken for food containers during the first half of the year is on faith and if the crops do not prove so heavy as expected, the present big movement will be partly at the expense of third quarter business.

Cold-Finished Steel Bars.—Although the automotive industry is not doing as well as it was expected to by this time, makers of cold-finished steel bars report a very steady demand from the parts makers and a good demand from other consuming industries. Most of the orders from the automobile parts makers are for small tonnages, but that is more satisfactory than the withholding of specifications and the suspensions of shipments that makers of other automobile steels are reporting. The ordinary tonnage price remains at 2.50c., base Pittsburgh. A new card of extras on cold-finished alloy steel bars is in preparation and will be issued shortly.

Hot-Rolled Flats.—Demand for these lines is holding up relatively well, and in strips most makers find their orders for this month to be running slightly ahead of the same period last month. No deviations from quoted prices are reported. Prices are given on page 513.

Cold-Rolled Strips.—Backwardness of the automobile industry in reaching its expected production schedule is telling on the demand for cold-rolled strips. Specifications have dwindled considerably this month as compared with last month. There seems to be some effort by automobile builders to force lower prices, but evidence of success in that direction is lacking.

Prices of Finished Iron and Steel Products (Carload Lots)

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills.....	2.00c.
F.o.b. Chicago	2.10c.
Del'd Philadelphia	2.32c.
Del'd New York.....	2.34c. to 2.44c.
Del'd Cleveland	2.19c.
F.o.b. Birmingham	2.15c. to 2.25c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	2.00c.
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Rail Steel

F.o.b. mill	1.80c. to 1.90c.
F.o.b. Chicago	2.00c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	3.00c.
Common iron, del'd Phila'phia.....	2.22c.
Common iron, del'd New York.....	2.24c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.80c. to 1.90c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.00c. to 2.10c.
Del'd Cleveland	1.99c. to 2.09c.
Del'd Philadelphia	2.07c. to 2.12c.
Del'd New York.....	2.09c. to 2.14c.
C.i.f. Pacific ports.....	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.12c. to 2.22c.
Del'd New York.....	2.24c. to 2.34c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh.....	2.50c.
All gages, 6 in. and wider, P'gh.....	2.80c.
All gages, 6 in. and narrower, Chicago.....	2.60c.
All gages, wider than 6 in., Chicago.....	2.50c.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills.....	2.50c.
Bars, f.o.b. Chicago.....	2.50c.
Bars, Cleveland	2.55c.
Shafting, ground, f.o.b. mill.....	2.70c. to 3.00c.
Strips, f.o.b. Pittsburgh mills.....	3.90c.
Strips, f.o.b. Cleveland mills.....	3.90c.
Strips, delivered Chicago.....	4.20c.
Strips, f.o.b. Worcester mills.....	4.05c.

*According to size.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	\$2.65
Galv'd nails, 1-in. and longer.....	4.65
Galv'd nails, shorter than 1 in.....	4.90
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails.....	2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage.....	\$2.50
Annealed fence wire.....	2.65
Spring wire	3.50
Galv'd wire, No. 9.....	3.10
Barbed wire, galv'd.....	3.35
Barbed wire, painted.....	3.10

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh.....	2.45c. to 2.50c.
Nos. 9 and 10, f.o.b. Ch'go dist. mills.....	2.60c.
Nos. 9 and 10, del'd Phila'phia.....	2.82c.

Box Annealed, One Pass Cold Rolled

No. 28, f.o.b. Pittsburgh.....	3.25c. to 3.35c.
No. 28, f.o.b. Chicago dist. mill.....	3.45c.
No. 28, del'd Phila'phia.....	3.67c.

Galvanized

No. 28, f.o.b. Pittsburgh.....	4.50c. to 4.60c.
No. 28, f.o.b. Chicago dist. mill.....	4.70c.
No. 28, del'd Philadelphia	4.92c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.25c. to 3.35c.
No. 28, f.o.b. Chicago dist. mill.....	3.45c.

Automobile Body Sheets

No. 22, f.o.b. Pittsburgh.....	4.40c.
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Long Ternes

No. 28, 8-lb. coating, f.o.b. mill.....	4.85c.
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Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per package, 20 x 28 in.)

8-lb. coating, 100	20-lb. coating I.C. \$16.20
1b. base.....	\$11.40
8-lb. coating I.C. 11.70	25-lb. coating I.C. 17.90
15-lb. coating I.C. 14.85	30-lb. coating I.C. 19.45
	40-lb. coating I.C. 21.65

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series Numbers	Base Per 100 Lb.
2100* (1/2% Nickel, 0.10% to 0.20% Carbon)	\$3.20 to \$3.25
2300 (3/4% Nickel)	4.50 to 4.60
2500 (5% Nickel)	5.70 to 5.80
3100 (Nickel Chromium)	3.50 to 3.60
3200 (Nickel Chromium)	5.00 to 5.25
3300 (Nickel Chromium)	7.00 to 7.25
3400 (Nickel Chromium)	6.25 to 6.50
5100 (Chromium Steel)	3.50
5200* (Chromium Steel)	7.00 to 7.50
6100 (Chrom. Vanadium bars).....	4.20 to 4.30
6100 (Chrom. Vanad. spring steel)	3.80
9250 (Silicon Manganese spring steel)	3.20 to 3.25
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.).....	4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.45 to 4.55
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.25 to 4.35
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.40 to 3.50
Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2 1/2-in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	\$36.00 to \$7.00
Light (from rail steel), f.o.b. mill.....	\$4.00 to \$5.00
Light (from billets), f.o.b. Ch'go mill	\$6.00 to \$8.00

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, 3/4 in. and larger.....	\$2.80 to \$3.10
Spikes, 1/2 in. and smaller.....	3.00 to 3.60
Spikes, boat and barge.....	3.25
Track bolts, all sizes.....	4.00 to 4.60
Tie plates, steel.....	2.25
Angle bars	2.75

Welded Pipe

Base Discounts f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel	Black	Galv.	Inches	Iron	Black	Galv.
1/4	45	19 1/4	1/4 to 3/4	11	11	11
3/4 to 1	51	25 1/4	1/2	22	22	22
1 1/4 to 1 1/2	56	42 1/4	3/4	28	28	28
1 1/2 to 2	60	48 1/4	1 to 1 1/4	30	30	30
2 to 3	62	50 1/4				

Lap Weld

2	55	43 1/4	2	23	23	23
2 1/2 to 6	59	47 1/4	2 1/2	26	26	26
7 and 8	56	43 1/4	3 to 6	28	28	28
9 and 10	54	41 1/4	7 to 12	26	26	26
11 and 12	53	40 1/4				

Butt Weld, extra strong, plain ends

1/4	41	24 1/4	1/4 to 3/4	19	19	19
3/4 to 1	47	30 1/4	1/2	21	21	21
1 1/4 to 1 1/2	53	42 1/4	3/4	28	28	28
1 1/2 to 2	58	47 1/4	1 to 1 1/4	30	30	30
2 to 3	61	50 1/4				

Lap Weld, extra strong, plain ends

2	53	42 1/4	2	23	23	23
2 1/2 to 4	57	46 1/4	2 1/2 to 4	29	29	29
4 1/2 to 6	56	45 1/4	4 1/2 to 6	28	28	28
7 to 8	52	39 1/4	7 to 8	21	21	21
9 and 10	45	32 1/4	9 to 12	16	16	16
11 and 12	44	31 1/4				

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1 1/2 points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2 1/2 %.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2 1/4 in.....	27
2 1/4 to 2 1/2 in.....	27
2 1/2 to 2 3/4 in.....	27
2 3/4 to 3 in.....	40
3 to 3 1/4 in.....	42 1/2
3 1/4 to 3 1/2 in.....	46
3 1/2 to 4 in.....	46
4 to 4 1/4 in.....	46
4 1/4 to 4 1/2 in.....	46
4 1/2 to 4 3/4 in.....	46
4 3/4 to 5 in.....	46
5 to 5 1/4 in.....	46
5 1/4 to 5 1/2 in.....	46
5 1/2 to 5 3/4 in.....	46
5 3/4 to 6 in.....	46
6 to 6 1/4 in.....	46
6 1/4 to 6 1/2 in.....	46
6 1/2 to 6 3/4 in.....	46
6 3/4 to 7 in.....	46
7 to 7 1/4 in.....	46
7 1/4 to 7 1/2 in.....	46
7 1/2 to 7 3/4 in.....	46
7 3/4 to 8 in.....	46
8 to 8 1/4 in.....	46
8 1/4 to 8 1/2 in.....	46
8 1/2 to 8 3/4 in.....	46
8 3/4 to 9 in.....	46
9 to 9 1/4 in.....	46
9 1/4 to 9 1/2 in.....	46
9 1/2 to 9 3/4 in.....	46
9 3/4 to 10 in.....	46
10 to 10 1/4 in.....	46
10 1/4 to 10 1/2 in.....	46
10 1/2 to 10 3/4 in.....	46
10 3/4 to 11 in.....	46
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31 1/2 to 31 3/4 in.....	46
31 3/4 to 32 in.....	46
32 to 32 1/4 in.....	46
32 1/4 to 32 1/2 in.....	46
32 1/2 to 32 3/4 in.....	46
32 3/4 to 33 in.....	46
33 to 33 1/4 in.....	46

Steel and Iron Bars.—Buyers are specifying steadily against contracts, but combined specifications and new orders are not taxing productive capacity and deliveries on new business are steadily becoming more prompt. Makers are experiencing no resistance to 2c., base Pittsburgh, on the general run of ordinary tonnages. Iron bars are steady in price and are moving fairly well. Prices are given on page 513.

Structural Steel.—The steel fabricating companies in this district note a fairly good business and a fairly good inquiry, but still complain that very low prices are necessary to secure tonnage. The ruling price on plain material is still 1.90c., base Pittsburgh. The Carnegie Steel Co. is turning over its new 44-in. blooming mill serving its new 28-32-in. structural mill, and this unit is expected to go into operation soon.

Plates.—Mills in this area are still making an effort to get 1.90c., base Pittsburgh, on plates, and on small lots for shipment within the immediate Pittsburgh district that price is being obtained. Outside of this district, however, 1.85c. is the ruling maximum, and on sizable tonnages competition makes necessary a price of 1.80c. Railroad car business so far this month has been disappointing to local builders, and not much business is developing with other plate consumers.

Sheets.—While the flow of specifications is reasonably good, it is not keeping pace with completed obligations, and an increasing number of mills find it necessary to make price concessions of \$1 to \$2 a ton from the late November prices to get a share of passing business. Actually, adherence to the November prices is on the part of a few rather than a majority of the makers or of the capacity. Price cutting is more common in black than in galvanized or blue annealed sheets, but it is difficult to maintain prices of the latter grades while there is weakness in black sheets. The loss of automobile sheet business still is felt. That industry has not yet materially reduced its stocks of cars and is moving into production rather slowly. At that, releases against body sheet contracts are a little heavier, and an interesting feature is that very prompt shipment is demanded in all cases. The automotive industry needs a few weeks of open weather. There has been considerable curtailment of sheet production, but even at 75 per cent of capacity it is probably in excess of present demands and some makers, running at a higher rate, find this possible only by making attractive prices. Prices are given on page 513.

Bolts, Nuts and Rivets.—Demand for these products is steady, but hardly active enough to tax the capacity of makers. Prices are holding well, except for a little irregularity in the prices of large rivets. Prices and discounts are given on page 515.

Coal and Coke.—The end of the anthracite strike has been followed by a flood of cancellations and suspensions of contracts for coke for domestic use, and prices have broken sharply. The market today was quotable at from \$5 to \$6 per net ton, ovens, for run-of-oven 48-hr. coke, \$6 to \$7 for 72-hr. coke and from \$6.50 to \$8 for crushed coke. These prices are just about half what could be obtained a week ago. Indications point to even lower prices before the week is over, because it is said there is enough coke in transit to take care of all Eastern demands until anthracite coal is again available. Meanwhile Connellsville production has been speeded up and it is likely that until a cut can be made in output, a good deal of "distress" coke will be coming on the market. It is reported that two Eastern blast furnaces recently closed for second quarter requirements and paid \$4 per net ton at ovens, but furnaces in this part of the country are delaying their purchases and expect to get their supplies at well under \$4. With anthracite coal available and only about a month more of winter, Connellsville operators are now very largely dependent on metallurgical sources for an outlet for the coke. There is a fair market for domestic sizes of soft coal, but no great activity in other grades. Prices are given on page 515.

Old Material.—The market here is still very dull and dealers are finding it hard to dispose of material ex-

cept at, or near, buyers' valuations. Consumers are not buying, and dealers with orders offer the principal outlet for the tonnages reaching the market. Not being pressed for deliveries against orders, dealers are in no haste to cover against them. There is no buying of scrap for throwing down on the yards. The result is a weak market. Scrap is cheap enough, but many dealers have exhausted war-time profits in speculating on the long side of the market and others are dissuaded from buying because the steel manufacturers have been successful in getting supplies without bidding up prices. Successful dealers have found that placing the consumer ahead of the producer has paid, and the market now seems to be shaping itself on that basis. It is commented on that for the first time in several years, yard scrap can now be bought at a price that fairly insures a profitable turnover. Some sales of No. 1 railroad steel are noted at \$18, but \$17.50 appears to be as high as most users of that grade will pay and on the general run of offerings of heavy melting grade the market may be appraised at \$17. Compressed and bundled sheets have eased off another 50c. per ton, and the market is weaker on turnings. One important user of machine shop turnings is offering only \$13; no sales that low are yet noted, while as much as \$14 has been paid by dealers with orders to cover. A similar situation exists in heavy breakable cast scrap, with \$14 bid, but none offered under \$15. The end of the anthracite strike has killed the market for coke as a hard coal substitute, and with the steel companies no longer able to sell coke at high prices, they will use more in their blast furnaces and less scrap. The market already is weaker on the blast furnace grades of scrap.

We quote for delivery to consumer's mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$17.00 to \$18.00
No. 1 cast, cupola size	17.00 to 17.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 19.50
Compressed sheet steel.....	16.00 to 16.50
Bundled sheets, sides and ends..	15.00 to 15.50
Railroad knuckles and couplers..	20.50 to 21.00
Railroad coil and leaf springs...	20.50 to 21.00
Low phosphorus blooms and bil- let ends	22.00 to 22.50
Low phosphorus plates and other material	21.00 to 21.50
Low phosphorus punchings.....	20.00 to 20.50
Railroad malleable	18.50 to 19.00
Steel car axles.....	21.50 to 22.00
Cast iron wheels	18.00 to 18.50
Rolled steel wheels.....	20.00 to 20.50
Machine shop turnings.....	13.00 to 14.00
Short shoveling turnings.....	14.00 to 14.50
Sheet bar crops.....	20.00 to 21.00
Heavy steel axle turnings	16.50 to 17.00
Short mixed borings and turnings	14.00 to 14.50
Heavy breakable cast.....	14.00 to 15.00
Stove plate	14.00 to 14.50
Cast iron borings.....	14.00 to 14.50
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	17.50 to 18.00

Warwick Furnaces Revert to Owners

The Warwick blast furnaces at Pottstown, Pa., owned by the Warwick Iron & Steel Co., which have been operated for years under a lease by the Eastern Steel Co., Pottsville, Pa., now in receivership, have been turned back to the Warwick Iron & Steel Co. by the receiver, Edward L. Herndon, under a forfeiture clause in the lease which provides for a penalty of \$100,000 in the event the lease was cancelled before the termination of the period. A few weeks ago the furnaces were advertised for sale for county taxes, but the sale was stopped by order of the United States District Court in Philadelphia on application of the Eastern Steel Co.'s receiver. The principal stockholders of the Warwick company were prepared to bid in the property, but the receiver decided to terminate the lease rather than have the property put up at auction. The Warwick Iron & Steel Co. has attached all of the personal property of the Eastern Steel Co. at the furnaces as security for the payment of the \$100,000 forfeit.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Semi-Finished Steel F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rolling, 4-in. and over.....	\$35.00
Rolling, 2-in. and smaller.....	\$6.00
Forging, ordinary	40.00
Forging, guaranteed	45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$36.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$35.00
6 in. x 2 in. and smaller.....	\$6.00

Skelp

	Per Lb.
Grooved	1.90c.
Sheared	1.90c.
Universal	1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base, No. 5 to 3/4-in.....	\$45.00
Common soft, coarser than 3/4-in.....	\$2.50 over base
Screw stock	\$6.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is \$46. Cleveland mill base, \$45.

Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	9.50c. to 10c.
Iron ore, Swedish, average 66% iron.....	9.50c.
Manganese ore, washed, 51% manganese, from the Caucasus.....	45c.
Manganese ore, Brazilian or Indian, nominal	42c. to 44c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.50 to \$14.00

Chrome ore, Indian basic, 48% Cr₂O₃, crude, c.i.f. Atlantic seaboard.....

Molybdenum ore, 85% concentrates of MoS₂, delivered

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$5.00 to \$6.00
Foundry, f.o.b. Connellsville prompt	6.00 to 7.00
Foundry, by-product, Ch'go ovens	10.50
Foundry, by-product, New England, del'd	13.00
Foundry, by-product, Newark or Jersey City, delivered.....	11.52
Foundry, Birmingham	5.75 to 6.50
Foundry, by-product, St. Louis or Granite City	10.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$2.10
Mine run coking coal, f.o.b. W. Pa. mines	1.90 to 2.25
Mine run gas coal, f.o.b. W. Pa. mines	2.00 to 2.25
Steam slack, f.o.b. W. Pa. mines.....	1.00 to 1.15
Gas slack, f.o.b. W. Pa. mines.....	1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$115.00
Foreign, 80%, Atlantic or Gulf port, duty paid	115.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$32.00 to \$34.00
Domestic, 16 to 19%	\$1.00 to \$3.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$85.00
75%	145.00
	Per Gross Ton Furnace
10%	\$42.00
11%	42.00
	Per Gross Ton Furnace
12%	\$42.00
14 to 16%	\$46 to 46.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	\$36.00
10%	\$36.00
11%	38.00
	Per Gross Ton
12%	\$40.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	\$28.50
6%	29.50
7%	30.50
8%	32.00
9%	32.00
	Per Gross Ton
10%	\$34.00
11%	36.00
12%	38.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	\$1.15 to \$1.20
Ferrochromium, 4% carbon and up, 60 to 70% Cr., per lb. contained Cr. delivered	11.50c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.25 to \$4.00
Ferrocabontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electrolytic, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton.....	\$91.00
Ferrophosphorus, electrolytic, 24%, f.o.b. Anniston, Ala., per net ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00 to \$17.50
No. 2 lump, Illinois and Kentucky mines.....	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid,	\$17.00 to \$17.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
High Duty	Moderate Duty
Pennsylvania	\$43.00 to \$46.00
Maryland	48.00 to 50.00
Ohio	48.00 to 46.00
Kentucky	48.00 to 45.00
Illinois	48.00 to 45.00
Missouri	40.00 to 43.00
Ground fire clay, per ton.....	6.50 to 7.50

Silica Brick

	Per 1000 f.o.b. Works
High Duty	Moderate Duty
Pennsylvania	\$40.00
Chicago	49.00
Birmingham	54.00
Silica clay, per ton.....	\$8.00 to 9.00

Magnesite Brick

	Per Net Ton
Standard size, f.o.b. Baltimore and Chester, Pa.	\$45.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$48.00

Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)

	Per Cent Off List
Machine bolts, small, rolled threads.....	.60, 10 and 5
Machine bolts, all sizes, cut threads,	50, 10, 10 and 5
Carriage bolts, smaller and shorter, rolled threads .....	.50, 10, 10 and 5
Carriage bolts, cut threads, all sizes.....	.50, 10 and 5
Eagle carriage bolts.....	.65 and 10
Lag bolts .....	.60, 10, 10 and 5
Plow bolts, Nos. 3 and 7 heads.....	.60 and 10
(Extra of 20% for other style heads)	
Machine bolts, c.p.c. and t. nuts, 3/4 x 4 in., 45, 10 and 10	45, 10 and 10
Larger and longer sizes.....	45, 10 and 10
Bolt ends with hot-pressed nuts.....	.50, 10, 10 and 5
Bolt ends with cold-pressed nuts.....	.45, 10 and 10
Hot-pressed nuts, blank and tapped, square,	4.25c. off list
Hot-pressed nuts, blank or tapped, hexagons,	4.65c. off list
C.p.c. and t. square or hex. nuts, blank or tapped	4.85c. off list
Washers*	6.50c. to 6.25c. off list

*F.o.b. Chicago and Pittsburgh.
The discount on machine, carriage and lag bolts is 5 per cent less than above for less than car lots. On hot-pressed and cold-pressed nuts the discount is 25c. less per 100 lb. than quoted above for less than car lots.

Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Semi-finished hexagon nuts:	
1/4 in. and smaller, U. S. S.....	.80, 10 and 5
1/2 in. and larger, U. S. S.....	.75, 10 and 5
Small sizes, S. A. E.....	.80, 10, 10 and 5
S. A. E., 3/4 in. and larger.....	.75, 10, 10 and 5
Stove bolts in packages.....	.80, 10 and 5
Stove bolts in bulk.....	.80, 10, 5 and 2 1/2
Tire bolts .....	.60 and 5

Semi-Finished Castellated and Slotted Nuts

(Actual freight allowed up to but not exceeding 50c. per 100 lb.)

	Per 100 Net S.A.E. U.S.S.	Per 100 Net S.A.E. U.S.S.
1/4-in.....	\$0.44	\$0.44
1/2-in.....	0.515	0.515
3/4-in.....	0.62	0.66
1-in.....	0.79	0.90
1 1/4-in.....	1.01	1.05
1 1/2-in.....	1.33	1.42
1 3/4-in.....	1.70	1.73
2-in.....	2.10	2.10

Larger sizes.—Prices on application.

Large Rivets

	Base Per 100 Lb.
F.o.b. Pittsburgh	\$2.50 to \$2.60
F.o.b. Cleveland	2.70
F.o.b. Chicago	2.75

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh .....	.70 and 10
F.o.b. Cleveland .....	.70 and 10
F.o.b. Chicago .....	.70 and 10 to 70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Milled cap screws.....	.80 and 10
Milled standard set screws, case hardened.....	.80
Milled headless set screws, cut thread.....	.80
Upset hex. head cap screws, U. S. S. thread,	80, 10 and 10
Upset hex. cap screws, S. A. E. thread,	80 and 10
Upset set screws.....	.80, 10 and 10 to 80, 10 and 5
Milled studs .....	.70 and 5

Chicago

Heavy Rail and Fastening Orders—Large Bookings of Car Steel

CHICAGO, Feb. 16.—The rail market has again been active, and contracts for a total of 51,000 tons of standard sections have been taken by local makers. The outstanding order was 33,000 tons placed by the Rock Island. Track accessories have also moved in good volume, the total for the week including 8000 tons to go with the Rock Island rails. Although makers of rails are operating mills at full capacity, specifications are being received faster than shipments can be made.

Mills report the week just closed the best for many months, both in new buying and fresh specifications. It would appear, however, that this situation is due, at least in part, to the unusual demand for rails. As a whole, new business so far in February compares favorably with that of January. New bookings are said to be in excess of shipments. Chicago mills have taken over 40,000 tons of steel for the Pacific Fruit Express cars. The Santa Fe has placed 23 passenger cars of various types, and the Northern Pacific and the Burlington have definitely entered the market for a total of 1500 freight cars.

Competition in outlying districts is very keen and steel prices are unsteady. In the immediate Chicago territory, however, prices are unchanged. Better deliveries are enabling Eastern mills to penetrate the local market, this being particularly true in the case of universal mill plates and plates of heavy section.

The merchant pig iron market remains steady, and the effect on it by the anthracite strike settlement is as yet undetermined. Repairs to the Federal furnace, which was blown out last week, are progressing more rapidly than was anticipated, and operators report that it will be ready to resume, should occasion demand, within the next few weeks.

Although the scrap market is steadier, it is still predominantly weak. Large railroad shipments continue to be received, and dealers are experiencing considerable difficulty in finding buyers for such material as cannot be applied against previous obligations.

Ferroalloys.—Several carlot sales of ferromanganese are reported at the ruling price of \$115, seaboard. The few small tonnage sales of spiegeleisen made during the week were of the 16 to 19 per cent grade and brought \$33, Hazard. Dealers are still unable to quote on the 19 to 22 per cent grade. Buyers show no interest in 50 per cent ferrosilicon.

We quote 80 per cent ferromanganese, \$122.56, delivered Chicago; 50 per cent ferrosilicon, \$85, delivered; spiegeleisen, 18 to 22 per cent, \$41.76, delivered Chicago.

Pig Iron.—The settlement of the anthracite strike has had no effect as yet on the Chicago pig iron market and prices remain firm. On several occasions in the past when prices have remained on a level over an extended period, as has been the case in this market during the past few months, a wavering in price has resulted. Sellers feel, however, that the present level will hold because a fair amount of second quarter tonnage has been placed at the present market. Furnace operations remain unchanged, and it is said that shipments to the trade from the Indiana Harbor furnace of the Youngstown Sheet & Tube Co. are only slightly less than the combined tonnage from the Iroquois and Federal furnaces which were recently blown out. Spot buying has shown a little more activity than during the previous week. A Milwaukee user has closed for 2000 tons of Northern iron, and a railroad with a terminal at Chicago is inquiring for 2500 tons of foundry and malleable. Silvery is more active, and several lots of the 8 per cent have been sold to Chicago district users. Several small inquiries have been received for low phosphorus iron for delivery during March. A Chicago district user purchased 300 tons of Southern iron for prompt delivery. This was taken on the basis of \$22, Birmingham, and is to be shipped all-rail,

bringing the delivered price to \$28.01. Charcoal iron remains fairly active, with the price unchanged.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnaces, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards.

Northern No. 2 foundry, sil. 1.75 to 2.25	\$23.00
Northern No. 1 foundry, sil. 2.25 to 2.75	23.50
Malleable, not over 2.25 sil.	23.00
High phosphorus	23.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (all rail)	\$27.01 to 28.01
Southern No. 2 (barge and rail)	26.18 to 27.18
Low phosph., sil. 1 to 2 per cent, copper free	31.20 to 31.70
Silvery, sil. 8 per cent.	35.29
Ferrosilicon, 14 to 16 per cent.	48.79

Bars.—Although bookings of soft steel bars are well maintained, they are the one irregular spot in a market which has brought to Chicago mills the largest volume of new business for one week which has been entered in many months. The Chicago mill price of 2.10c. is firm. Demand for alloy steel bars shows no change and local makers are operating at practically 100 per cent of capacity. Specifications from automobile and tractor manufacturers are liberal, and prices are unchanged. Bar iron specifications are not so heavy as during the previous week, and only a small tonnage was added to mill books. Mills are discouraged by a situation which keeps their operations on a hand-to-mouth basis. Bar iron is steady at 2c., Chicago. Makers of rail steel bars find that new business is somewhat heavier than a month ago, and that specifications are running ahead of shipments. Stocks of this commodity are light and manufacturing users are buying close to their actual production requirements. Producers of fence posts are said to be unusually busy and are specifying heavily. Rail steel bars are still quoted at 2c., Chicago.

Mill prices are: Mild steel bars, 2.10c., Chicago; common bar iron, 2c., Chicago; rail steel bars, 2c., Chicago.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.60c. for rounds and hexagons and 4.10c. for flats and squares; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.60c., Chicago warehouse.

Plates.—Forty thousand tons of plates, shapes and bars have been added to Chicago makers' books through the placement by the Pacific Fruit Express of 4043 refrigerator cars with Chicago district car builders. Active car inquiries total 6100, and the prospects are that at least two Western railroads will soon enter the market for 3000 to 4000 cars. This means that a total of close to 100,000 tons of car steel is pending or in early prospect. Car lettings during the week were light, and no new outstanding inquiries have made their appearance. Inquiries for oil storage tanks do not total more than 3000 tons, and current orders are confined to small tonnages. It is reported, however, activity among the oil producers in the Southwest is likely to bring out some good tonnage within the near future. Chicago makers of plates are busy, particularly on universal mill plates on which local deliveries are considerably beyond what can be obtained from Eastern makers. Competition in outlying districts is keen and although plates from outside mills are finding their way into this market, they are doing so on the basis of early delivery. The local mill price of 2.10c. is steady.

The mill quotation is 2.10c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Structural Material.—The outstanding structural award of the week is 1175 tons for the Eitel-Decker Hotel, Chicago. As a general rule, awards and inquiries are light in tonnage and few in number. Considerable tonnage, however, is represented by projects in prospect. The tonnage still on mill books is said to be fairly heavy, as a result of heavy awards made during the late fall and winter months. Most Chicago district fabricators have from two to three months of work on their books. Plain material remains steady at 2.10c., Chicago.

The mill quotation on plain material is 2.10c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Wire Products.—Specifications from the manufacturing trade are unchanged in volume as compared to the previous week. Stocks in the hands of jobbers are said to be consistent with the demands being made upon them. Mills find that there is a noticeable improvement in the volume of business emanating from the extreme Southwest. Prices are shown on page 513.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed wire, \$3.30 per 100 lb.; common wire nails, \$3.05 per keg; cement-coated nails, \$2.05 to \$2.20 per count keg.

Rails and Track Supplies.—Fifty-one thousand tons of rails have been added to the books of local mills. New orders are as follows:

The Rock Island Lines placed 28,000 tons with the Illinois Steel Co. and 5000 tons with the Inland Steel Co. The St. Louis Southwestern placed 13,200 tons, of which 10,000 tons went to the Illinois Steel Co. and 3200 tons to the Bethlehem Steel Co. The Minneapolis & St. Louis ordered 5000 tons from local mills, and the Missouri-Kansas-Texas bought 13,000 tons, the bulk of which was taken by the Tennessee Coal, Iron & Railroad Co., with the remainder divided between the Illinois Steel Co. and the Inland Steel Co.

The Rock Island order carried with it about 8000 tons of track fastenings, which were distributed on the same basis as the rails. All told, local mills have booked 10,000 tons of angle bars in addition to the 3000 tons called for by the New York Central when it took up its option, and 30,000 kegs of spikes and 20,000 kegs of bolts. Reports are current here that the Rochester, Buffalo & Pittsburgh placed 3000 tons of rails during the week. Rail specifications are said to be considerably heavier than shipments. Light rails, which are still quoted at \$36 to \$38 per gross ton, Chicago mills, are not in great demand. Makers report that new orders totaled only 700 tons for the week.

Standard Bessemer and open-hearth rails, \$43: light rails, rolled from billets, \$36 to \$38 per gross ton, f.o.b. maker's mill.

Standard railroad spikes, 2.90c. to 3c., mill; track bolts with square nuts, 3.90c. to 4c., mill; steel tie plates, 2.25c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of Chicago warehouse at 3.55c., base, and track bolts, 4.55c., base.

Cast Iron Pipe.—On bids taken during the week at Toledo, Ohio, on 630 tons of 6, 12 and 16-in. Class B pipe, James B. Clow & Sons were low at \$39.85, base Birmingham. The bid of the United States Cast Iron Pipe & Foundry Co. was \$42, Birmingham. Decatur, Ill., has awarded 200 tons of 6 and 12-in. Class B centrifugal pipe to the United States company. The Chicago market is quiet both in inquiries and actual buying. Deliveries on sizes up to 24-in. are said to range from 40 to 60 days.

We quote per net ton, delivered Chicago, as follows: Water pipe, 4-in., \$54.20; 6-in. and over, \$49.20 to \$50.20; Class A and gas pipe, \$4 extra.

Bolts, Nuts and Rivets.—Specifications continue to be liberal, and makers are operating at an unchanged rate. Large rivets are steady at \$2.75, base, per 100 lb., and small rivets remain at 70 and 10 to 70 and 5 off, Chicago. Discounts and prices are shown on page 515.

Jobbers quote structural rivets, 3.50c. per lb.; boiler rivets, 3.70c. per lb.; machine bolts up to $\frac{3}{4}$ x 4 in., 50 and 5 per cent off; larger sizes, 50 and 5 off; carriage bolts up to $\frac{3}{4}$ x 4, 47½ off; larger sizes, 47½ off; hot-pressed nuts, square, tapped or blank, \$3.25 off; hot-pressed nuts, hexagons, tapped or blank, \$3.75 off; coach or lag screws, 55 and 5 per cent off.

Sheets.—New business continues to lag, although current specifications against first quarter contracts are being received in such volume as to keep mills operating close to capacity. Mills are sold for 60 to 90 days on blue annealed sheets and from three to four weeks on galvanized and black sheets. If specifications continue to come forward at the present rate, local mills will be in need of additional tonnage in galvanized and black sheets by the middle of March. Chicago delivered prices are unchanged at 3.50c. for black, 2.65c. for blue annealed and 4.75c. for galvanized.

Chicago delivered prices from mill are 3.50c. for No. 28 black, 2.65c. for No. 10 blue annealed and 4.75c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.50c. base for blue annealed, 4.10c. base for black, and 5.25c. base for galvanized.

Sheet Bars.—This commodity is in good demand, and local makers have booked over 7000 tons of new business. Prices are firm at \$36 per gross ton.

Hot Rolled Strip.—Demand is well maintained and prices are unchanged at 2.60c., base per lb., Chicago, for all gages, 6 in. and narrower, and 2.50c. for wider material.

Reinforcing Bars.—Concrete bar contracts placed during the week were small in aggregate tonnage. Fresh inquiry is not heavy, although the activity of architects indicates that a good volume of new business lies ahead. In many instances both architects and contractors are slow in placing contracts, thereby delaying action on many inquiries which have been pending since early in January. The bulk of business now open is made up of small and medium-sized projects, whereas a year ago 12,000 to 15,000 tons was pending in a few active projects. The winter in Chicago has been fairly open, permitting construction to progress with little delay; business has had a more even trend during the present period. Billet steel reinforcing bars are unchanged at 2.60c., Chicago warehouse.

Coke.—By-product foundry coke shipments are said to be the heaviest in the history of the local industry. The price remains unchanged at \$10.50, local ovens, or \$11, delivered in the Chicago switching district.

Old Material.—A slightly better feeling is developing in this market, although the trend of prices still leans toward the weaker side. Car manufacturers and foundries specializing in railroad work have come into the market quietly, and although the tonnages they have taken and inquired for are small, the price level of a week ago has held for the most part. Brokers who still have obligations to meet are buying heavy melting steel at \$14 per gross ton. The surplus of practically all commodities is still a very important factor in the market, together with the fact that users' stocks are ample. Consumers, as a rule, are buying only such items as are necessary to keep stocks balanced. The Rock Island is advertising a list for 5000 tons, including 1500 tons of rerolling rails and 1000 tons of cast iron car wheels. Other railroad offerings include 2000 tons offered by the Santa Fe, 2000 tons by the Northern Pacific, and 1500 tons by the Grand Trunk.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

Per Gross Ton	
Iron rails	\$17.50 to \$18.00
Cast iron car wheels	17.00 to 17.50
Relaying rails, 56 lb. to 60 lb.	25.00 to 26.00
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Forged steel car wheels	18.00 to 18.50
Railroad tires, charging box size	18.00 to 18.50
Railroad leaf springs, cut apart	18.00 to 18.50
Rails for rolling	16.50 to 17.00
Steel rails, less than 3 ft.	17.50 to 18.00
Heavy melting steel	13.75 to 14.00
Frogs, switches and guards, cut apart	15.50 to 16.00
Shoveling steel	13.75 to 14.00
Drop forge flashings	11.00 to 11.50
Hydraulic compressed sheets	12.25 to 12.75
Axle turnings	15.00 to 15.50
Steel angle bars	17.00 to 17.50
Steel knuckles and couplers	17.00 to 17.50
Coil springs	18.50 to 19.00
Low phos. punchings	16.50 to 17.00
Machine shop turnings	8.75 to 9.25
Cast borings	11.75 to 12.25
Short shoveling turnings	11.75 to 12.25
Railroad malleable	17.50 to 18.00
Agricultural malleable	16.50 to 17.00

Per Net Ton	
Iron angle and splice bars	15.75 to 16.25
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	25.00 to 25.50
Steel car axles	17.50 to 18.00
No. 1 busheling	11.00 to 11.50
No. 2 busheling	8.75 to 9.25
Pipes and flues	10.00 to 10.50
No. 1 railroad wrought	12.75 to 13.25
No. 2 railroad wrought	12.25 to 12.75
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	15.50 to 16.00
No. 1 agricultural cast	15.50 to 16.00
Locomotive tires, smooth	16.50 to 17.00
Stove plate	14.50 to 15.00
Grate bars	13.00 to 13.50
Brake shoes	12.50 to 13.00

Birmingham

Barge Service Expected to Stimulate Steel Exports—Scrap Weak

BIRMINGHAM, Feb. 16.—In view of a steady flow of inquiries and an improvement in buying, pig iron producers look for a continuation of present furnace operations throughout the first half of 1926. Fourteen blast furnaces in this State are producing foundry iron, nine are on basic, one is on ferromanganese and one on mold iron, making a total of 25 active stacks. Local melt of pig iron is increasing. Cast iron pressure pipe makers are particularly active, having large unfilled tonnages on hand. Quotations on pig iron are unchanged at \$22 per ton, Birmingham for No. 2 foundry. Stove foundries are pressing for deliveries, since their busy season in manufacturing is now under way. Gas range production in the South has increased since the sheet mill of the Tennessee company started operations. Many smaller consumers, with exception of makers of soil pipe and fittings, are expanding their activities.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry, 1.75 to 2.25 sil...	\$22.00
No. 1 foundry, 2.25 to 2.75 sil...	22.50
Basic	22.00
Charcoal, warm blast	30.00 to 32.00

Rolled Steel.—Fabricating plants are operating full, and many of the finishing mills are running at close to capacity. Many of the smaller consumers of sheets are buying more frequently, since they are now able to get quick shipment. Formerly orders called for larger amounts, because the sheets had to be shipped from Pittsburgh and other outside producing centers. Export business in rails and other products is reported. Government operation of a barge line on Warrior River, with terminal facilities at Birmingham, and an 18-mile rail connection with Ensley, is expected to stimulate foreign trade. Plates are still quoted at 2c. to 2.15c., base Birmingham, bars at 2.15c. to 2.25c., and structural shapes at 2.05c. to 2.15c.

Cast Iron Pipe.—The probable output of cast iron pipe for the first three months of year has been well covered, and where possible production is being increased. In view of steady bookings for second quarter delivery, good business throughout the first half of the year seems assured. Six-inch and larger pipe has been selling at \$41, Birmingham, and \$1 per ton more is being asked on second quarter deliveries. Transportation continues good, and shipments equal the make. The American Cast Iron Pipe Co. expects to complete its centrifugal pipe plant by April 15.

Coke.—Shipments of coke in box cars to Chicago, Detroit and other distant centers are moving forward steadily, and local consumption of coke is good. Every by-product plant in this district and several hundred bee-hive ovens are operating. Quotations range from \$5.75 to \$6, ovens. The settlement of the anthracite strike is not expected to have an immediate effect on demand. Southern makers hope that their coke has made a favorable impression in outlying districts.

Old Material.—The market still shows weakness, and new business is very light. Quotations, although virtually nominal, are unchanged. Scrap is plentiful and dealers' yard forces are still busy filling specifications against old obligations.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical...	\$15.00 to \$16.00
Heavy melting steel	14.00 to 14.50
Railroad wrought	13.00 to 13.50
Steel axles	19.00 to 20.00
Iron axles	18.00 to 19.00
Steel rails	14.00 to 14.50
No. 1 cast	17.00 to 17.50
Tramcar wheels	17.00 to 17.50
Car wheels	16.00 to 16.50
Stove plate	14.00 to 14.50
Machine shop turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Rolls for rolling	17.50 to 18.00

St. Louis

Consumers Cautious Because of Slack Business—Pig Iron Dips

ST. LOUIS, Feb. 16.—The stability of the pig iron market in this district has been threatened by the activities of a leading Chicago interest, which last week sold about 1200 tons of foundry iron in lots of 100 to 400 tons on the basis of \$21, Chicago, which is \$2 under the market as quoted in Chicago. A sale to a St. Louis stove maker of Southern iron at \$22, base Birmingham, also was reported. The St. Louis Coke & Iron Corporation is quoting nominally \$23.50 to \$24, Granite City. Despite weakness in prices, inquiries before the trade total about 30,000 tons, including 10,000 to 15,000 tons of basic iron for an east side melter for shipment through the second quarter; 1000 to 1500 tons of foundry for an implement maker; 500 tons for a Peoria melter; 250 tons for an Illinois implement manufacturer and 300 to 400 tons for an Oklahoma user. Most melters are cautious about buying for the future, for while their plants are busy there is a slackening of new business.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices, \$2.16 freight from Chicago, \$4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25...	\$25.66
Northern malleable, sil. 1.75 to 2.25	25.66
Basic	25.66
Southern fdy., sil. 1.75 to 2.25...	\$26.42 to 27.92
Granite City iron, sil. 1.75 to 2.25.	24.31 to 24.81

Coke.—Colder weather in the East further stimulated demand for domestic grades of coke. Piles at by-product ovens in the district have been leveled, and there is a demand for all that can be produced. The market is strong at unchanged prices, although there is a premium for spot coke. The demand for metallurgical coke is slowing down.

Finished Iron and Steel.—The principal transaction of the week was the purchase by the St. Louis Southwestern Railway of 13,300 tons of 85-lb. rails for their Texas lines—10,000 tons from the Illinois Steel Co. and 3300 tons from the Bethlehem Steel Co. Notwithstanding some slight improvement in sheet demand, new business and specifications are disappointing. Tank plates are in better demand, and several inquiries from the Oklahoma oil fields totaling 2000 tons are pending. A new letting of Missouri highway contracts last week will develop some new business for reinforcing bar interests, and the awards of the Illinois commission, set for Feb. 19, include about 600 tons of this material. Fabricators of structural steel are confining purchases to special jobs, and are not putting by any stock.

For stock out of warehouse we quote: Soft steel bars, 3.15c. per lb.; iron bars, 3.15c.; structural shapes, 3.25c.; tank plates, 3.25c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, cold rolled, one pass, 4.60c.; galvanized sheets, No. 28, 5.70c.; black corrugated sheets, 4.65c.; galvanized, 5.75c.; cold-rolled rounds, shafting and screw stock, 3.75c.; structural rivets, 3.65c.; boiler rivets, 3.85c.; tank rivets, $\frac{7}{8}$ -in. diameter and smaller, 70 per cent off list; machine bolts, 55 per cent; carriage bolts, 50 and 5 per cent; lag screws, 55½ per cent; hot-pressed nuts, square, \$3.25 off list; hexagon, blank or tapped, \$3.75 off list.

Old Material.—The market is extremely dull, and prices continue to decline. While consumers in the district are operating almost to capacity and are using up their stocks of raw material, they decline to buy any more for the present because new business is coming in very slowly and, in some cases, customers are withholding specifications on business already placed. Dealers are buying only to take care of such few sales as they have made. One leading dealer here states that he has fewer orders on his books now than at any time within the last 18 months. Railroad lists issued during the week include: Chesapeake & Ohio, 9600 tons;

Rock Island, 5000 tons; Atchison, Topeka & Santa Fe, 3500 tons; and Tennessee Central, 2000 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	\$13.00 to \$13.50
Rails for rolling	16.25 to 16.50
Steel rails less than 3 ft.	17.00 to 17.50
Relaying rails, 60 lb. and under ..	24.00 to 25.00
Relaying rails, 70 lb. and over ..	30.00 to 31.00
Cast iron car wheels	17.25 to 17.75
Heavy melting steel	14.00 to 14.50
Heavy shoveling steel	14.00 to 14.50
Frogs, switches and guards cut apart	15.50 to 16.00
Railroad springs	17.00 to 17.50
Heavy axles and tire turnings ..	11.75 to 12.25
No. 1 locomotive tires	16.50 to 17.00
Per Net Ton	
Steel angle bars	13.50 to 14.00
Steel car axles	17.25 to 17.75
Iron car axles	22.50 to 23.00
Wrought iron bars and transoms ..	19.00 to 19.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	12.50 to 13.00
Cast iron borings	10.00 to 10.50
No. 1 bushelings	10.00 to 10.50
No. 1 railroad cast	14.75 to 15.25
No. 1 machinery cast	16.50 to 17.00
Railroad malleable	13.50 to 14.00
Machine shop turnings	6.75 to 7.25
Bundled sheets	7.50 to 8.00

Youngstown

Irregularity in Sheet Mill Schedules— Lower Sheet Prices Now General

YOUNGSTOWN, Feb. 16.—Irregularity in the release of specifications is still felt in the Mahoning Valley, being reflected in curtailed production schedules. The Republic Iron & Steel Co. has banked the No. 2 blast furnace in its Haselton group, while the Youngstown Sheet & Tube Co. has banked No. 1 stack at Hubbard. These suspensions reduce the number of active blast furnaces in the Youngstown district to 23 of 42.

Blast furnace operators have benefited from the anthracite strike, now settled, in that they have been able to divert large tonnages of coke to the Eastern market. The Struthers Furnace Co., purchasing coke under contract at \$4, has lately been reselling this material in the East at prices ranging from \$10.25 to \$10.50, furnace yard. The profit is larger than the company would have made had the coke been used for smelting purposes.

Sheet mill schedules show more irregularity than those in any other rolled products line, with the possible exception of plates. The \$2 per ton concession which developed within recent weeks on black, galvanized and full-finished stock has become more general within the past 10 days. Mahoning Valley schedules this week show a gain of 23 mills over the preceding week, with 114 of 127 scheduled. However, the percentage of active capacity for the week will scarcely be any higher than in the preceding week, as many mills are scheduled for only part-time operation.

One group of 16 mills, which ordinarily starts on the Sunday midnight shift, did not get under way this week until Tuesday morning. The Waddell Steel Co., Niles, which was inactive two weeks ago, started six mills this week, while the Falcon Steel Co., down for a week, resumed with five mills. Some of the active units are scheduled for only a few days' production, and will suspend unless additional business is received in the meantime.

However, sheet producers feel that the market will show improvement from now on, gathering strength as weather conditions improve.

Producers of the lighter steel materials state that adverse weather conditions have retarded sales by holding back construction. All steel products entering into construction are affected by this condition, including butt-weld pipe, sheets, light plates, merchant bars and, to some extent, strip steel.

Steel ingot output at 75 per cent of capacity is keeping pace with sheet production. Of 53 independent open-hearth furnaces, 37 are active. Bessemer plants are operating at 80 per cent. There has been some

curtailment in the ingot output rate of the Steel Corporation subsidiaries in this district.

Independent bar mills are running at 80 per cent of capacity; tube mills at 85 per cent; skelp mills at 80 per cent; strip and tin plate units close to capacity, and plate mills at 65 per cent. The Republic company is on a 75 per cent basis and the Sheet & Tube company is producing at an 80 per cent rate.

Operations of fabricators, such as the Truscon Steel Co., have been retarded by weather conditions. This company is maintaining production at 70 per cent. The Youngstown plant of the Kalman Steel Co. is down to a 25 per cent basis.

Spring jobbing demand is developing in wire and wire products, say producers.

Heavy melting steel is lagging, with prices ranging from \$18 to \$18.50.

Cincinnati

Coke Declines—Pig Iron Dull—Scrap Weak

CINCINNATI, Feb. 16.—Pig iron buying in the past week has been negligible. Although the majority of consumers have not covered their second quarter needs and have meager stock piles, they are satisfied for the moment to contract only for enough tonnage to care for their immediate requirements. The hesitancy in making forward purchases is ascribed to the fact that buyers believe that prices will not advance in the near future and that they will be able to contract for iron at, or below, the present level within the next month. Furnaces in the Ironton district are holding to \$21, base Ironton, and are booking small lots at that figure. Practically all of the resale iron offered at a concession by several brokers in the past two weeks has been disposed of. There have been a few sales of Tennessee iron, which can be secured at \$21.50, base Birmingham, for second quarter delivery. While one Alabama producer is quoting \$22, base Birmingham, on iron for February and March shipment, furnaces in that State are refusing to name a price for second quarter. The silvery iron market is quiet. Aside from an inquiry for 500 tons of malleable iron for delivery in the next two months, prospective business consists of lots ranging from single carloads up to 200 tons.

Based on freight rates of \$3.69 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:

Alabama fdy., sil. 1.75 to 2.25 (base)	\$25.69
Alabama fdy., sil. 2.25 to 2.75	26.19
Tennessee fdy., sil. 1.75 to 2.25	25.19
Southern Ohio silvery, 8 per cent	32.77
So. Ohio fdy., sil. 1.75 to 2.25	23.27
Southern Ohio, malleable (nominal)	23.27

Coke.—The sudden termination of the anthracite strike has left the local coke market in a state of excitement. Dealers are concentrating their attention principally on getting consumers to accept tonnages which they have contracted for in the last few weeks. While there has been no sharp let-down in prices except on Connellsville coke, a considerable decrease within the next five days is anticipated. Connellsville foundry grades, which were selling a week ago at \$12, ovens, or higher, are now obtainable at \$7, ovens, or \$10.53, delivered Cincinnati. Furnace coke from that district has dropped proportionately and is available at \$9.53, delivered here. Although dealers are unable to secure New River foundry coke for spot shipment, they are quoting \$9.59 to \$10.09 for forward delivery. Furnace grades are quoted at \$8.59 to \$9.09. Wise County foundry for delivery up to July 1 is selling at \$8.59, delivered Cincinnati. The movement of liberal tonnages of Alabama coke into Michigan is noted. Shipments of by-product foundry and domestic coke in the first half of February showed an increase over the corresponding period last month.

Based on freight rates of \$2.14 from Ashland, Ky., \$3.53 from Connellsville, and \$2.59 from Wise County ovens and New River ovens, we quote f.o.b. Cincinnati: Connellsville foundry, \$10.53; Wise County foundry, \$8.59; New River foundry, \$9.59 to \$10.09; by-product foundry, \$10.64.

Finished Material.—Bookings in the first half of February have been moderate in volume, but one seller

states that they exceeded those for the entire month of January. Buyers are conservative in estimating their needs and are taking only enough material to satisfy their immediate requirements. They are not so ready to accept mill quotations as they were a short time ago, being more disposed to press for concessions from those producers who are eager for tonnage. Sales of bars have been fairly good, and quotations are firm at 2c., base Pittsburgh. Structural shapes remain at 1.90c. to 2c., base Pittsburgh, although there has been no attractive business to test these prices. While small lots of plates are being sold at 1.90c., base Pittsburgh, 1.85c. better represents the market. The Louisville & Nashville Railroad has bought 300 tons of plates and sheets. The movement of black sheets has been only fair, but prices are steady at 3.35c., base Pittsburgh. Demand for galvanized sheets has improved, with sales at 4.60c., base Pittsburgh. Blue annealed and automobile body sheets are quoted at 2.50c. and 4.40c., base Pittsburgh, respectively, with specifications and orders at a low point. Operations of one sheet producer in this territory are being maintained at capacity, while another company's schedules in the past week called for 60 per cent of capacity. There has been an increase in orders and specifications for nails and wire. Common wire nails are quoted at \$2.65 per keg, Pittsburgh or Ironton, and plain wire at \$2.50 per 100 lb., Pittsburgh or Ironton. Gas holder fabricators are busy on several large jobs and prospects are favorable for a liberal amount of new work.

Cincinnati jobbers quote: Iron and steel bars, 3.30c. per lb.; reinforcing bars, 3.30c.; hoops, 4c. to 4.25c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds and hexagons, 3.85c.; squares, 4.35c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.10c. to 4.30c.; No. 28 galvanized sheets, 5.25c. to 5.40c.; No. 9 annealed wire, \$3 per 100 lb.; common wire nails, \$2.95 per keg base; cement coated nails, \$2.25 per keg; chain, \$7.55 per 100 lb. base; large round head rivets, \$5.75 base; small rivets, 65 per cent off list. Boiler tubes, prices net per 100 ft., lap-welded steel tubes, 2-in., \$18; 4-in., \$38; seamless, 2-in., \$19; 4-in., \$39.

Reinforcing Bars.—While mills are bidding on several jobs of 25 to 100 tons each, no important projects have appeared. However, a number of sizable undertakings are expected to come to a head within the next two months. New billet bars are quoted at 2c., Cleveland, and rail steel bars at 1.90c., mill.

Warehouse Business.—Inclement weather so interfered with business in the past week that jobbers made the smallest number of sales in many months. There is a fair movement of bars and nails, but structural steel and reinforcing bars are quiet. Prices remain unchanged.

Old Material.—Although Portsmouth, Ohio, mills are again accepting shipments on contract, consumers are not interested at present in further purchases of scrap. Consequently, the market is exceedingly dull, and dealers believe that there will be no pick-up for at least a month. No change has occurred in prices, but they show a soft tendency. The Louisville & Nashville has a list of 8000 gross tons, of which 3240 tons consists of No. 1 steel rails, closing Feb. 17, while the Chesapeake & Ohio is offering about the same tonnage, on which bids close this week.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting.....	13.50 to 14.00
Short rails	18.00 to 18.50
Relaying rails	27.00 to 27.50
Rails for rolling.....	14.50 to 15.00
Old car wheels.....	13.00 to 13.50
No. 1 locomotive tires.....	16.50 to 17.00
Railroad malleable	15.50 to 16.00
Agricultural malleable	14.50 to 15.00
Loose sheet clippings.....	8.50 to 9.50
Champion bundled sheets.....	10.50 to 11.00
Per Net Ton	
Cast iron borings.....	8.50 to 9.00
Machine shop turnings.....	7.50 to 8.00
No. 1 machinery cast.....	19.50 to 20.00
No. 1 railroad cast.....	15.00 to 15.50
Iron axles	22.50 to 23.00
No. 1 railroad wrought.....	10.00 to 10.50
Pipes and flues.....	8.50 to 9.00
No. 1 busheling.....	9.50 to 10.00
Mixed busheling	8.50 to 9.00
Burnt cast	8.50 to 9.00
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50

San Francisco

Buying Limited—Fresh Inquiries Small but Quotations Are Consistently Firm

SAN FRANCISCO, Feb. 12 (By Air Mail).—Despite the fact that business during the past week has been confined to routine developments, and that few fresh inquiries of importance have come up for figures, quotations in all departments of the market have remained firm. A conspicuous instance of this is the higher quotations now being made by most of the local reinforcing bar jobbers. While this in no way represents a definite market advance, it nevertheless reflects to some extent a stronger price tendency, and possibly the end, temporarily at least, of price shading on concrete bars. Most of the local bar jobbers are now asking about 2.85c., base per lb., on carload lots and 3.20c. on less-than-carload lots. Less than two weeks ago 2.40c. on carload lots and larger tonnages was considered possible. About 2.75c. is now being quoted by jobbers on larger quantities than carload lots.

Pig Iron.—A local importer recently received about 1000 tons of Indian foundry iron which is being quoted at about \$25, duty paid, f.o.b. cars San Francisco. This importer has contracted for regular shipments of Indian iron which, it is understood, will average about 1000 tons a month. Approximately half of this will be taken monthly by southern California users. Current sales are mostly of small lots. Prices are unchanged.

*Utah basic	\$27.00 to \$28.00
*Utah foundry, sil. 2.75 to 3.25...	27.00 to 28.00
**English foundry, sil. 2.75 to 3.25...	25.00 to 26.00
**Belgian foundry, sil. 2.75 to 3.25...	24.00
**Dutch foundry, sil. 2.75 to 3.25...	24.00
**Indian foundry, sil. 2.75 to 3.25...	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25...	24.00
**Chinese foundry, sil. 3 to 3.50...	25.50

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Shapes.—About 1125 tons of steel was awarded for fabrication during the past week. The largest individual letting was 800 tons for a car float for the Santa Fe system awarded to the Moore Dry Dock Co., Oakland, Cal. The Caterpillar Tractor Co., San Leandro, Cal., is inquiring for about 150 tons of shafting, plates and small shapes for stock. Bids have closed on 4500 tons required for the Hunter-Dulin Building in San Francisco, but no award has yet been made. Eastern mill quotations on plain material remain unchanged at 2.35c., c.i.f. Coast ports.

Plates.—It is understood that the 200 tons of material required by the San Joaquin Light & Power Co., Fresno, Cal., for a penstock job has been placed with foreign interests, but confirmation is lacking. No other awards of more than 100 tons have been reported during the past week, and no fresh inquiries of importance have come into the market. Eastern mills continue to quote 2.30c., c.i.f. Coast ports.

Bars.—Local reinforcing bar jobbers are now asking 2.85c., base per lb. on carload lots, 3.20c. on less-than-carload lots, and about 2.75c. on more than carload lots. These quotations, however, have not been tested, as the amount of work now being figured is not large. Individual lettings calling for 100 tons and over total about 390 tons.

Sheets.—A local user has placed about 100 tons of blue annealed sheets with an Eastern producer. That is the only transaction of any consequence known to have been closed. Quotations are as follows: Blue annealed sheets, 2.50c., base per lb., Pittsburgh; galvanized sheets, 4.50c. to 4.60c., base, and black sheets 3.35c., base.

Cast Iron Pipe.—Recent awards reported include the following:

Mountain View, Cal., 157 tons, to the Grinnell Co. of the Pacific.
 Santa Cruz, Cal., 199 tons, to the United States Cast Iron Pipe & Foundry Co.
 Wasco, Cal., 325 tons of 4, 6 and 8-in. Class B, to E. K. Angle.
 San Diego, Cal., 267 tons of 4 and 6-in. Class B, to Bertram Noble.
 Puyallup, Wash., 185 tons of 4, 6, 14 and 18-in. Class B, to B. Nicoll & Co.
 City of Seattle, Wash., Federal Avenue extension, 513 tons of 8 and 20-in. Class B, to B. Nicoll & Co.

Glendore, Cal., 110 tons of 12 and 13-in. Class B, to B. Nicoll & Co.

Englewood, Cal., 140 tons, 105 tons to National Cast Iron Pipe Co. and 35 tons to B. Nicoll & Co.

Steel Pipe.—The city of Uplands, Cal., has awarded 121 tons of 6, 8 and 12-in. standard line pipe, as follows: 95 tons to Fairbanks-Morse Co. and 26 tons to M. O. Haldeman.

Warehouse Business.—Business during the past week has been somewhat sluggish. The number of orders is fairly substantial, but the quantity of material called for by individual orders is small. Prices are unchanged.

Local warehouse prices, per 100 lb., are as follows: Merchant bars, \$3.30 base; merchant bars, $\frac{3}{4}$ in. and under, rounds, squares and flats, \$3.80 base; soft steel bands, \$4.15 base; angles, $\frac{1}{4}$ in. and larger x $1\frac{1}{2}$ in. to $2\frac{3}{4}$ in., incl., \$3.30 base; channels and tees, $\frac{3}{4}$ in. to $2\frac{3}{4}$ in., incl., \$3.90 base; angles, beams and channels, 3 in. and larger, \$3.30 base; tees, 3 in. and larger, \$3.30 base; universal mill plates, $\frac{1}{4}$ in. and heavier, stock lengths, \$3.30 base; spring steel, $\frac{1}{4}$ in. and thicker, \$6.30 base; wire nails, \$3.50 base; cement coated nails, \$3 base; No. 10 blue annealed sheets, \$3.75; No. 28 galvanized sheets, \$6; No. 28 black sheets, \$4.75.

Coke.—The Southern Pacific Co. is inquiring for 350 tons. Current buying is light and confined to small quantities. Importers' prices are unchanged.

English beehive, \$15 to \$16 per ton at incoming dock, and English by-product, \$12 to \$14; German by-product, \$11.50 to \$12.

Old Material.—Buying is somewhat light, although there is a fair amount of small business being done. Prices are unchanged.

Prices for scrap delivered to consumers' yards are as follows:

Per Gross Ton	
No. 1 heavy melting steel.....	\$11.50 to \$12.00
Scrap rails, miscellaneous.....	11.50 to 12.00
Rolled steel wheels.....	11.50 to 12.00
Couplers and knuckles.....	11.50 to 12.00
Country mixed scrap.....	8.00 to 8.50
Mixed borings and turnings.....	6.00 to 6.50
No. 1 cast scrap.....	19.50 to 20.00

Buffalo

Scrap Continues to Decline—Pig Iron and Steel Markets Colorless

BUFFALO, Feb. 16.—Pig iron inquiry has improved, and indications are that some sizable buying will develop. According to various estimates pending business totals from 3000 to 6000 tons. The Standard Gas Equipment Corporation has bought 1000 tons of foundry for its Jersey City plant, and a maker of electrical equipment is seeking 1500 tons of foundry for the second quarter. According to reports here the Worthington Pump & Machinery Corporation has not yet bought for its local plant. Shipments are keeping up according to schedule, and furnaces believe their customers must soon again come into the market. The market remains at \$21, base furnace, for No. 2 plain foundry.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25.....	\$21.00
No. 2X foundry, sil. 2.25 to 2.75.....	21.50
No. 1 foundry, sil. 2.75 to 3.25.....	22.50
Malleable, sil. up to 2.25.....	21.00
Basic.....	\$20.50 to 21.00
Lake Superior charcoal.....	29.28

Finished Iron and Steel.—Activity in structural steel has taken on a new lease of life, and the Buffalo fabricators are busy. A considerable tonnage in small jobs has been booked. One Buffalo shop will fabricate two 100-ton jobs, one an addition to a foundry and machine plant in Niagara Falls and the other a mill building in Rochester. Specifications on bars are lighter, but prices are still firm at 2.265c., Buffalo. The sheet market is fairly steady, with galvanized stronger than black. Wire business continues good. Pipe business has shown improvement. Jobbers of bolts are specifying freely. Canadian business is much better, with implement in-

terests specifying more freely in view of increased sales.

Warehouse prices are being quoted as follows: Steel bars, 3.30c. per lb.; steel shapes, 3.40c.; steel plates, 3.40c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized, 5.75c.; cold-rolled shapes, 4.45c.; cold-rolled rounds, 3.95c.; wire nails, 3.90c.; black wire, 3.90c.

Old Material.—The market continues to slip with the release of a flood of material which dealers were unable longer to hold. Demand has subsided completely, and most of the prices quoted are strictly nominal. Borings and turnings have declined, and other commodities which have weakened are stove plate, grate bars, hand bundled sheets, No. 1 cast and malleable. Mills apparently have been able to maintain their stock piles by small purchases at reduced prices over the past few weeks, and it is problematical when they will buy in quantity, particularly because rolling programs are not quite so heavy as they were.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel.....	\$16.00 to \$16.50
Low phosphorus.....	19.50 to 20.00
No. 1 railroad wrought.....	14.00 to 14.50
Car wheels.....	17.00 to 17.50
Machine shop turnings.....	11.50 to 12.00
Mixed borings and turnings.....	12.50 to 13.50
Cast iron borings.....	12.50 to 13.50
No. 1 busheling.....	15.50 to 16.00
Stove plate.....	14.50 to 15.00
Grate bars.....	13.00 to 13.50
Hand-bundled sheets.....	11.00 to 11.50
Hydraulic compressed.....	15.00 to 15.50
No. 1 machinery cast.....	16.50 to 17.00
Railroad malleable.....	18.50 to 19.00
No. 1 cast scrap.....	17.00 to 17.50
Iron axles.....	25.00 to 26.00
Steel axles.....	17.50 to 18.00

Boston

Foreign Pig Iron Sales Exceed Domestic—Snow Retards Scrap Operations

BOSTON, Feb. 16.—More foreign than domestic pig iron was sold in this market last week. Indian iron led in activity, aggregate sales amounting to some 2500 tons at \$21 to \$23, on dock, duty paid, mostly around \$22 to \$22.50 for 2.50 to 3 per cent silicon material. Included in these sales was 500 tons originally intended for Baltimore, which was landed here by a disabled steamer. Prices obtained for Indian iron are considerably out of line with those quoted on Continental iron, the latter being obtainable at \$20.50, on dock, duty paid, for 2.50 to 3 per cent silicon. Buffalo, eastern and western Pennsylvania irons shared about equally in activity, but the combined sales of all three fell well under those of Indian. Buffalo iron is generally quoted at \$21, base furnace. Delivered prices from Buffalo are being met by western Pennsylvania furnaces and the Troy, N. Y., stack. At least two eastern Pennsylvania furnaces are competing actively for business and have offered iron at less than \$22.50, base furnace, or \$26.15, delivered. It is said an eastern Pennsylvania steel mill is shading pig iron prices, but the report is not confirmed. A western Massachusetts foundry has let it be known it might purchase 2000 to 3000 tons low silicon iron for second quarter, but at less than prevailing prices. It is an informal inquiry. A Springfield, Mass., melter is in the market for 500 tons of No. 1X and 200 tons of No. 2X foundry for second quarter. A Holyoke, Mass., plant has still to cover on iron for delivery into September.

We quote delivered prices on the basis of the latest sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25.....	\$26.15
East. Penn., sil. 2.25 to 2.75.....	26.65
Buffalo, sil. 1.75 to 2.25.....	25.91
Buffalo, sil. 2.25 to 2.75.....	26.41
Virginia, sil. 1.75 to 2.25.....	29.92
Virginia, sil. 2.25 to 2.75.....	30.42
Alabama, sil. 1.75 to 2.25.....	31.60 to 32.60
Alabama, sil. 2.25 to 2.75.....	32.10 to 33.10

Cast Iron Pipe.—Newton, Mass., has awarded 1050 tons of 6-in. and 20-in. pipe to the Warren Foundry & Pipe Co.; Springfield, Mass., 400 tons of 6-in. and 8-in. pipe to the United States Cast Iron Pipe & Foundry Co.; Malden, Mass., 350 tons of 4-in., 6-in. and 8-in. pipe to the Donaldson Iron Co., and Concord, Mass., 100 tons of 6-in. and 8-in. pipe to R. D. Wood & Co. French pipe interests were the low bidders for the Malden business. Bids closed Feb. 16 for approximately 800 tons of 6-in. to 16-in. pipe required by Pawtucket, R. I. Private business continues in fair volume, with prices on small pipe steady and on large more or less unsettled. Pipe representatives intimate the usual March 1 advance in pipe prices is on schedule. Current domestic pipe quotations follow: 4-in., \$60.10 a ton, delivered, common Boston freight rate points; 6-in. to 16-in., \$56.10; 20-in. and larger, \$55.10. The usual extra of \$5 a ton is asked on Class A and gas pipe.

Coke.—The ending of the anthracite strike has had no visible influence on the New England fuel situation. Imported anthracite is still moving freely at prices fully as high as previously reported. No imported coke has arrived in more than a month. Gas companies are turning away coke customers, and New England by-product coke makers are handicapped in making domestic fuel deliveries by the weather. On the other hand, by-product foundry coke deliveries are remarkably free, heavy snows notwithstanding. Most foundries have dug out sidings and spur tracks, thereby facilitating deliveries. The demand for foundry coke is heavier than a month ago, but the price remains unchanged at \$13, delivered, within a \$3.10 freight rate zone. The New England Coal & Coke Co.'s Everett, Mass., ovens have operated at capacity for more than a year, and in that period have produced more crushed and foundry coke than ever before in a similar period.

Old Material.—Current inactivity in old material is accentuated by disrupted transportation and scrap piles deeply buried in snow. Prevailing prices on heavy melting steel are \$11 to \$11.50, on cars shipping point, but at least one of the largest local firms can do \$11.50 to \$12 on selected material. The market for pipe is stagnant, while that for chemical borings is steadily working downward because of lack of demand. For such material as forged scrap and skeleton, prices appear somewhat steadier than a week ago, presumably because more of it has been moved recently than other materials. Shafting for New England delivery is quoted as high as \$18 to \$18.50, on cars shipping point, but for Pennsylvania delivery \$17 appears the best most dealers will do. According to the trade here, the current movement of old material is smaller than it has been in years.

The following prices are for gross-ton lots delivered consuming points:

Textile cast	\$19.50 to \$20.00
No. 1 machinery cast	19.00 to 19.50
No. 2 machinery cast	15.00 to 16.00
Stove plate	14.00 to 14.50
Railroad malleable	19.50 to 20.00

The following prices are offered per gross-ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$11.00 to \$12.00
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	12.00 to 12.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	11.00 to 11.50
Machine shop turnings	9.00 to 9.50
Cast iron borings, chemical	10.75 to 11.25
Cast iron borings, rolling mill	9.00 to 9.50
Blast furnace borings and turnings	9.50 to 10.00
Forged scrap	9.50 to 10.00
Bundled skeleton, long	9.50 to 10.00
Forged flashings	9.50 to 10.00
Bundled cotton ties, long	8.50 to 9.00
Bundled cotton ties, short	9.50 to 10.00
Shafting	17.00 to 18.00
Street car axles	17.00 to 17.50
Rails for rerolling	13.00 to 13.25
Scrap rails	11.00 to 12.00

Mechanical stokers sold in January showed a heavy loss from December, according to reports to the Department of Commerce from 13 establishments. There were only 72 stokers, of 36,913 hp. rating, against 108, of 47,104 hp., in the preceding month. Except for November and August, January's total was the smallest since the previous January. The monthly average in 1925 was 112 stokers, of 46,111 hp.

New York

End of Strike Halts Pig Iron Buying—Decline in Steel Output Looked For

NEW YORK, Feb. 16.—Although sales of pig iron during the past week totaled close to 7000 tons, few orders have been placed since the settlement of the anthracite strike. It is pointed out that pig iron prices did not reflect the meteoric rise of fuel and consequently there is no reason to expect the sharp drop in coke to cause a decline in furnace quotations. Melters, however, feel satisfied that pig iron will not advance and see no reason for hastening to buy. Moreover, there are heavy offerings of foreign iron at attractive prices and current quotations by domestic stacks cannot be described as firm. While base prices seem to be holding fairly well at \$22, eastern Pennsylvania furnace, and \$21, Buffalo furnace, respectively, the concession of silicon differentials is more commonly reported. This is not surprising in view of the propensity of foreign furnaces to ignore the differentials. Although foreign producers are asking higher prices, stocks in the hands of importers at Eastern ports, said to exceed 14,000 tons, are being pressed for sale at from \$20.50 to \$21.50, duty paid. The Standard Gas Equipment Corporation recently closed for 1000 tons of foundry, part foreign and part domestic, for its Jersey City plant, but has not taken action on its requirements for Baltimore. The American Malleable Co. has bought 500 tons for its Owosso, Mich., plant. The Malleable Iron Works, New Britain, Conn., is in the market for 150 tons of malleable. The General Electric Co. is inquiring for 650 tons of malleable for its Erie, Pa., works. The Emporium Iron Co., Emporium, Pa., banked its furnace Feb. 10.

We quote per gross ton delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.54 from Virginia:

East. Pa. No. 2 fdy., sil. 1.75 to 2.25	\$24.52 to \$25.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.02 to 25.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	25.52 to 26.02
Buffalo fdy., sil. 1.75 to 2.25	25.91
No. 2 Virginia fdy., sil. 1.75 to 2.25	29.54

Ferroalloys.—Purchases of and inquiries for ferro-manganese are confined to small lots at prevailing prices, so far as can be learned. The same is true of spiegeleisen, prices of which continue firm. Specifications on contract for both alloys are fairly heavy and the same holds true for 50 per cent ferrosilicon and standard ferrochromium.

Finished Iron and Steel.—The character and volume of current steel business show no marked change. The volume this month has not gained over that of January, the new business consisting mainly of small lots, frequently not more than single carloads. Also specifications against contracts are coming to the mills very slowly, except in the case of structural steel, large tonnages of which are being specified against contracts placed in the last quarter of 1925. Mill operations continue at a good rate, approximately that of last month, but as shipments are still in excess of the new tonnage, the outlook is for a diminishing rate of production toward the end of the first quarter. The most promising source of new business is building construction. Although orders for structural steel since the first of the year have been smaller than in the closing months of last year, a good deal of work is pending that probably will be brought to the closing point in time for the beginning of construction work in the spring. In railroad equipment there is no inquiry of importance pending at the moment except that of the Seaboard Air Line for 3000 to 4500 freight cars, on which bids have been submitted by car builders. Prices of finished steel products remain fairly firm, with bars at 2c., shapes at 1.90c., and plates at 1.80c., Pittsburgh. There are continued reports of shading of prices on

black and galvanized sheets, but blue annealed sheets are quite steady at 2.50c., Pittsburgh.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.34c. to 2.44c. per lb.; plates, 2.09c. to 2.14c.; structural shapes, 2.24c. to 2.34c.; bar iron, 2.24c.

Warehouse Business.—Judged by the volume of business in the first half, February will be a month of only moderate activity. Nevertheless prices are fairly firm on most products and in the case of black and galvanized sheets, jobbers have generally advanced quotations to 4.50c. per lb. base on black and 5.50c. per lb. base on galvanized. While these prices are more nearly in line with the current mill quotations, buying is moderate and the new schedule is yet to be tested. Prices on page 542. We quote boiler tubes per 100 ft. as follows:

Lap welded steel tubes, 2-in., \$17.33; seamless steel, 2-in., \$20.24; charcoal iron, 2-in., \$25; 4-in., \$67.

Cast Iron Pipe.—Specifications are reported to be in preparation for about \$150,000 worth of bell and spigot pipe for New York to be purchased prior to a larger list which will call for \$500,000 worth. Bids open Feb. 16 on 2500 tons of 6 in. to 36 in. water pipe for Rochester and on 500 tons of 6 in. to 20-in. pipe for Schenectady. Prices are strong and in some quarters there is apparently expectation of an advance. The imported product is giving little competition at present. Practically all manufacturers of soil pipe are now on the higher basis of 2½ points smaller discount from list. Although the volume of current business is small, partly as a result of the recent storms and fair stocks in the hands of jobbers, makers are well booked with tonnage enough to carry them into April.

We quote pressure pipe per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$50.60 to \$52.60; 4-in. and 5-in., \$55.60 to \$57.60; 3-in., \$65.60 to \$67.60; with \$5 additional for Class A and gas pipe. Discounts both of Northern and of Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 42½ to 43¼ per cent off list; heavy, 52½ to 53¼ per cent off list.

Coke.—Following settlement of the coal strike, the coke market dropped from the maximum level of \$13.50 to \$14 per ton for furnace and foundry coke to a range of \$8 to \$9 per ton on foundry and \$6 to \$6.50 per ton on furnace. On contracts foundry coke is reported obtainable at as low as \$6.50 to \$7 per ton, Connellsville. Any further weakness is expected to be in furnace rather than foundry, as a result of the heavy production of the former for domestic sizing. Quotations on domestic coke are from \$7.50 to \$8.50 per ton. By-product is unchanged at \$11.52 per ton, delivered Newark or Jersey City, N. J.

Old Material.—Extreme inactivity continues with consumers largely refraining from purchasing and shipments of scrap further reduced by the recent storms and cold weather. Efforts of a few consumers to purchase tonnages on a basis of current buying prices of brokers are reported unsuccessful, as sellers are not inclined to commit themselves at the present low price schedule. Transactions are largely confined to small shipments of borings and turnings, machine shop turnings, bundled skeleton, breakable cast and stove plate.

Buying prices per gross ton, New York, follow:

Heavy melting steel (yard).....	\$11.00 to \$11.50
Heavy melting steel (railroad or equivalent).....	12.50 to 13.00
Rails for rolling.....	13.00 to 13.50
Relaying rails, nominal.....	23.00 to 24.00
Steel car axles.....	19.50 to 20.00
Iron car axles.....	23.50 to 24.00
No. 1 railroad wrought.....	14.00 to 14.50
Forge fire.....	10.50 to 11.00
No. 1 yard wrought, long.....	13.00 to 13.50
Cast borings (steel mill).....	10.00 to 10.25
Cast borings (chemical).....	14.00 to 14.50
Machine shop turnings.....	10.00 to 10.25
Mixed borings and turnings.....	10.00 to 11.00
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	11.75 to 12.25
Stove plate (steel mill).....	10.00 to 10.50
Stove plate (foundry).....	11.25 to 11.75
Locomotive grate bars.....	11.50 to 12.00
Malleable cast (railroad).....	16.50 to 17.50
Cast iron car wheels.....	13.50 to 14.00
No. 1 heavy breakable cast.....	13.25 to 14.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$17.50 to \$18.00
No. 1 heavy cast (columns, building material, etc.), cupola size	16.00 to 16.50
No. 2 cast (radiators, cast boilers, etc.).....	15.00 to 15.50

Cleveland

Steel Demand from Automobile Industry Disappointing—Pig Iron Sluggish

CLEVELAND, Feb. 16.—Mills are getting a fair volume of specifications against outstanding contracts for finished steel, but new demand continues light, although some of the mills report a slight improvement in small-lot orders. Business from the automotive industry shows a gain over last month, and because of this some of the mills have larger order books for sheets and hot and cold-rolled strip steel than they have had for several weeks. While some of the automobile companies have increased their production schedules, others are not getting orders for cars in the volume they had expected, and are still operating at considerably reduced schedules. Makers of automobile parts in this territory are fairly busy, and alloy steel is in good demand from this source. However, taken as a whole, the slowness with which the automotive industry has gotten under way since the first of the year has been somewhat disappointing.

New construction work is dragging, although a fair volume is in prospect. Some of the fabricating work that has been up recently has brought out low quotations. Awards are expected shortly on the pending Cleveland depot projects, aggregating 20,000 tons. An inquiry is out for 2500 tons for an addition to the Halle store building, Cleveland.

Outside of the recent recession in sheets, prices are holding steady. Steel bars are firm at 2c., base Pittsburgh. On plates 1.85c., base Pittsburgh, is the more common price, with good lots moving at 1.80c. and some small lot sales being made at 1.90c. Structural material ranges from 1.90c. to 2c., base Pittsburgh. Hot and cold-rolled strip steel are firm at regular quotations.

Jobbers quote steel bars, 3.10c. per lb.; plates and structural shapes, 3.20c.; No. 28 black sheets, 4.10c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.25c.; cold-rolled rounds and hexagons, 3.90c.; flats and squares, 4.40c.; hoops and bands, 3.85c.; No. 9 annealed wire, \$3 per 100 lb.; No. 9 galvanized wire, \$3.45 per 100 lb.; common wire nails, \$3 base per keg.

Pig Iron.—Pig iron buyers are now in a hesitating mood waiting to see what, if any, effect the settlement of the anthracite strike and the termination of the flurry in coke prices will have on pig iron prices. Sellers see no reason for any reduction in prices. They point out that the sharp advance in coke the past two months has not been reflected in any advance in pig iron and do not expect that coke prices for the second quarter will be any lower than their contract prices for the first quarter. On the other hand, it is evident that pig iron production will be increased by the starting up of banked furnaces by interests that recently have been selling by-product coke instead of pig iron, and producers admit that this increased output may have a weakening effect on the market. The market showed some activity before the announcement of the strike settlement, but since then it has been substantially at a standstill. When the price situation becomes more clearly defined, buying for the second quarter is expected to get under way. So far, little iron has been booked for that delivery. Prices on foundry and malleable iron in western Ohio, Michigan and eastern Indiana have settled down to \$22.50, furnace, a 50c. decline from the price that ruled in those territories for some time. This reduction, however, evidently was not due to a settlement of the coke strike, as one producer was virtually on the \$22.50 basis a week ago. The competition from other producing centers, particularly southern Ohio, seems to have been the predominating factor in bringing about this reduction. In Cleveland the ruling prices are unchanged at \$20.50, furnace, for foundry and malleable iron, both for local delivery and outside shipment. One producer during the week sold 5000 tons, but others did very little business. The market in Erie, Pa., continues fairly active. One con-

sumer in that city bought 1000 tons, and the Erie Steam Shovel Co. is inquiring for 1000 tons. The Hooven, Owens, Rentschler Co., Hamilton, Ohio, is inquiring for 2000 tons of foundry iron, and a Warren, Ohio, consumer wants 1000 tons of malleable iron. Tennessee low phosphorus iron is being offered for delivery to some Northern points at a price that is shutting out Valley iron, which is quoted at \$27.50, furnace.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6.01 from Birmingham:

Basic, Valley furnace.....	\$20.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25.....	\$22.26 to 22.50
Southern fdy., sil. 1.75 to 2.25.....	28.01
Malleable.....	22.26 to 22.50
Ohio silvery, 8 per cent.....	33.52
Standard low phos., Valley furnace.....	27.50 to 28.00

Iron Ore.—Outside of the inquiry of the Ford Motor Co. for 275,000 tons, no open market inquiry for Lake Superior ore has come out, and as the Ford company seems in no hurry for quotations, it may be several weeks before the prices of the season are named. Nothing has developed to change recent views regarding the season's prices, which are that either last season's prices will be reestablished, or there will be an advance of 25c. a ton.

Semi-Finished Steel.—With the lower prices on sheets, there is already some talk of slightly lower prices on sheet bars for the second quarter. The market is inactive. Specifications are rather light, and some of the mills could take on additional business. The only sale reported is 400 tons of forging billets placed at \$40, Pittsburgh.

Sheets.—Orders from the automotive industry in Detroit have improved, and some of the mills have more business on their books than for several weeks. Outside of this industry, new business and specifications are light. Plants of consumers are reported fairly busy, but still have good stocks. Some of the mills are in need of orders, and a curtailment in production is expected at the end of the week. Ruling prices are unchanged at 3.25c., Pittsburgh, for black, 2.40c. for blue annealed and 4.50c. for galvanized sheets, although prices at \$2 a ton higher on blue annealed and galvanized have not disappeared. On black sheets concessions to 3.15c. are reported. Automobile body sheets are established at 4.40c., Pittsburgh.

Reinforcing Bars.—Weakness has developed in billet steel reinforcing bars, on which a quotation of 1.90c., Pittsburgh, has appeared. Rail steel bars are unchanged at 1.80c. to 1.85c. at mill. A new inquiry is pending for 1000 tons for a warehouse in Detroit.

Coke.—The foundry coke market is in a completely unsettled condition because of the termination of the anthracite strike, and it is expected that it will take several days for prices to settle down to new levels. Both buyers and sellers are playing a waiting game, and no quotations have come out on Connellsville foundry coke. West Virginia foundry coke is offered at \$6.50, ovens, or a reduction of \$1 a ton. Some inquiry is coming out for by-product coke for domestic use, with offers of \$8.50, ovens, or a reduction of \$4 from the peak, which seems about in line with the price views of some of the producers. Sellers expect that the demand for by-product coke for domestic use will hold up fairly well for several weeks.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is quite satisfactory. Specifications show a gain over those of January, and the industry is reported to be operating at 70 per cent of capacity. Prices are firm. Rivets are in light demand. The regular price of \$2.60 per 100 lb. is being maintained for the small lots that are moving in this territory. Small rivets are holding to 70 and 10 per cent off list, except for more than car lots, which are bringing out a 5 per cent additional discount.

Old Material.—The market is lower on practically all grades. The sharpest reduction is on borings and turnings, which have declined \$1 a ton the past week. Deal-

ers bought odd lots at \$13.25 and then at \$13 for delivery to a Cleveland consumer, and now are offered this material at \$12.75. The demand for borings and turnings, for some time limited, has been further restricted by the holding up of shipments by two Ohio mills. There is no new demand by consumers and little attempt is being made by producers and dealers to effect sales.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$15.25 to \$15.75
Rails for rolling.....	16.75 to 17.00
Rails under 3 ft.....	19.00 to 19.50
Low phosphorus melting.....	17.75 to 18.25
Cast iron borings.....	12.25 to 12.50
Machine shop turnings.....	12.25 to 12.50
Mixed borings and short turnings.....	12.25 to 12.50
Compressed sheet steel.....	14.50 to 14.75
Railroad wrought.....	13.75 to 14.25
Railroad malleable.....	20.00 to 20.50
Light bundled sheet stampings.....	12.25 to 12.50
Steel axle turnings.....	14.50 to 14.75
No. 1 cast.....	17.50 to 18.00
No. 1 bushing.....	12.25 to 12.50
Drop forge flashings.....	13.25 to 13.50
Railroad grate bars.....	13.25 to 13.50
Stove plate.....	13.25 to 13.50
Pipes and flues.....	11.50 to 12.00

Philadelphia

Pig Iron Market Slightly Unsettled—Steel Buying in Moderate Volume

PHILADELPHIA, Feb. 16.—Some unsettlement of the pig iron market has followed the ending of the anthracite coal strike with its consequent effect on coke prices. Although eastern Pennsylvania furnaces are not anxious for business for the remainder of first quarter, they are now giving their attention to second quarter, and some are talking of \$22.50, base, on contracts for that period, with a possibility of \$22 being quoted. Even with contract furnace coke at \$4, the figure it is expected to reach for second quarter, furnace operators insist that less than \$22 would be profitless. As yet not much interest in second quarter contracting has developed. Nearly all of the furnaces have enough tonnage on their books to carry them well through April.

The volume of steel buying is disappointing to the steel trade. Tonnage projects are few and far between, the bulk of the current buying being in small lots, but early shipment is being requested in nearly every case, indicating that steel stocks in consumers' hands are low. A few of the mills are in better shape to make fairly prompt deliveries, the falling off in business having created some gaps in rolling schedules.

Buying of iron and steel scrap has dropped away almost to nothing, and there have been some further declines in prices.

Pig Iron.—There is agreement among local sellers of pig iron that the settlement of the anthracite coal strike will affect pig iron prices, although only to a slight degree. So far as the remainder of this quarter is concerned, the furnaces of this district are in a comfortable position, some having more tonnage on their books than can be filled by April 1, but the expectation that consumers will come into the market shortly to cover for second quarter has caused consideration of the prices to be quoted for that period. At least one furnace is ready to quote \$22.50, base, although its quotation on small lots for current shipment is \$23, and others indicate that they will not attempt to obtain more than \$22.50, with the possibility that \$22 may be their quotation. The foreign pig iron situation here will have no little to do with their decision. Several thousand tons of "distress" iron, received recently from Europe, is being freely offered at \$20.50, regardless of the silicon content, and sales have not been large even at that low figure. During the last two months, when domestic furnaces have frequently been unable to accept orders for prompt shipment, they have seen their customers supply their needs from stocks of for-

eign iron, and there seems no doubt that in selling for second quarter they will make an effort to stem this tide. Eastern furnace operators point out that the drop in coke prices will not affect their costs for second quarter as most of them were supplied with contract coke during the strike at \$4, Connellsville, and it is not expected that the second quarter contract price will be any lower. However, furnace coke has declined to \$5 to \$6, but another buying movement in heating coke is expected to develop in two or three weeks as in all probability there will not be enough anthracite coal produced within that time to supply the demand. There have been wholesale cancellations of orders for heating coke placed at the peak prices.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$23.76 to \$24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X.	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17
Basic, delivered eastern Pa.	23.00 to 23.50
Gray forge	23.00 to 23.50
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	24.00

Ferromanganese.—Sales of ferromanganese are very small, the market being quieter than it has been in months. The price remains unchanged, however, at \$115 for either domestic or foreign alloy.

Billets.—Eastern mills have not been able to maintain their advance of \$1 a ton on billets, and the ruling quotations in this district are again \$35, Pittsburgh, for rerolling quality and \$40 for forging quality. There are few sales.

Plates.—On open quotations Eastern plate mills name 1.80c., Pittsburgh, and are getting it in practically all cases, though there are no tonnages large enough to test the market. Moreover, all of the large users are covered for the entire quarter at less than 1.80c., and it is only miscellaneous requirements in small lots that are now coming to the mills, aside from contract specifications.

Structural Material.—Philadelphia continues to be a weak spot in the shape market. Eastern mills openly quote on small lots prices equivalent to 1.85c., Pittsburgh, and on larger lots their quotations are often about 1.80c., Pittsburgh. At some points in this district where the freight rate factor is not so much in favor of the Eastern mills the quotations average more nearly the equivalent of 1.90c., Pittsburgh. There is a lack of large building projects, but a fairly good run of small work is giving the mills a fair tonnage. The aggregate, however, is considerably below that of the closing months of last year.

Bars.—The letting of 1200 tons of concrete reinforcing bars for two Philadelphia school buildings to an importer of German and Belgian steel at 1.85c., delivered, duty paid, has caused considerable comment in the steel trade. The award was made by the William Cramp & Sons Ship & Engine Building Co., which received the general contract for the two schools. Demand for steel bars has shown some let-up, but the price remains firm at 2c., Pittsburgh, and mills have fairly good rolling schedules for several weeks. Bar iron is quoted at 2.22c., Philadelphia.

Sheets and Tin Plate.—Blue annealed sheets remain firm at 2.50c., Pittsburgh; galvanized sheets are being sold at 4.60c., notwithstanding occasional reports of 4.50c. quotations, while black sheets show some weakness, sales having been made at 3.25c., Pittsburgh. Tin plate specifications are good, and the demand for stock tin plate is fairly active. Some mills are now asking \$5 for stock plate, but quotations of \$4.75 are still obtainable.

Warehouse Business.—Steel bars, which have been the weakest item on the list of products carried in stock by local jobbers, are now fairly well held at a minimum

of 2.90c. The demand is fair. For local delivery jobbers quote as follows:

Soft steel bars and small shapes, 2.90c. to 3.20c. per lb.; iron bars (except bands), 2.90c. to 3.20c.; round edge iron, 3.50c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel, planished, 4.30c.; tank steel plates, ¼-in. and heavier, 2.80c. to 3c.; tank steel plates, ⅜-in., 3c.; blue annealed steel sheets, No. 10 gage, 3.50c.; black sheets, No. 28 gage, 4.65c.; galvanized sheets, No. 28 gage, 5.85c.; square, twisted and deformed steel bars, 3c.; structural shapes, 2.75c. to 2.90c.; diamond pattern plates, ¼-in., 5.30c.; ⅜-in., 5.50c.; spring steel, 5c.; rounds and hexagons, cold-rolled steel, 4c.; squares and flats, cold-rolled steel, 4.50c.; steel hoops, 4c. to 4.25c., base; steel bands, No. 12 gage to ⅜-in., inclusive, 3.75c. to 3.90c.; rails, 3.20c.; tool steel, 8.50c.; Norway iron, 6.50c.

Imports.—Pig iron imports last week totaled 4865 tons, of which 2425 tons came from England, 2300 tons from Germany and 140 tons from France. Other imports were: Iron ore from Germany, 495 tons; ferromanganese from England, 60 tons; galvanized steel strips from England, 14 tons; steel tubing from England, 4 tons; scrap iron from Cuba, 179 tons.

Old Material.—A sale of a few hundred tons of heavy melting steel at \$16.50, delivered, was made early last week, and later in the week another mill bought a small lot at \$16. Nothing higher than \$16 is obtainable today. The market is very weak, with very little demand. Several grades have declined about 50c. a ton within the week.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	\$16.00
Scrap rails	16.00
Steel rails for rolling	\$17.50 to 18.00
No. 1 low phos., heavy, 6.04 per cent and under	20.00 to 21.00
Couplers and knuckles	19.00 to 20.00
Roller steel wheels	19.00 to 20.00
Cast iron car wheels	17.50 to 18.00
No. 1 railroad wrought	17.50 to 18.00
No. 1 yard wrought	16.50 to 17.00
No. 1 forge fire	14.50 to 15.00
Bundled sheets (for steel works)	13.50
Mixed borings and turnings (for blast furnace)	13.50 to 14.00
Machine shop turnings (for steel works)	13.50
Machine shop turnings (for rolling mill)	14.00
Heavy axle turnings (or equivalent)	15.00
Cast borings (for steel works and rolling mill)	14.00
Cast borings (for chemical plant)	15.50 to 16.00
No. 1 cast	17.50 to 18.00
Heavy breakable cast (for steel works)	16.50 to 17.00
Railroad grate bars	14.50
Stove plate (for steel works)	14.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.50 to 16.00
Shafting	22.00 to 23.00
Steel axles	22.00 to 23.00

Further Weakness in Detroit Scrap

DETROIT, Feb. 16.—Further weakness has been noted in the Detroit scrap market due to the lack of purchasing and release of shipping orders now on dealers' books. The melt in the Michigan district is on a very good basis, but the district consumes practically none of the scrap produced here outside of automobile cast.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate. No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	\$13.75 to \$14.25
Borings and short turnings	10.50 to 11.00
Long turnings	9.75 to 10.25
No. 1 machinery cast	17.00 to 18.00
Automobile cast	23.00 to 24.00
Hydraulic compressed	12.75 to 13.25
Stove plate	13.50 to 14.50
No. 1 busheling	12.75 to 13.25
Sheet clippings	8.00 to 8.50
Flashings	10.75 to 11.25

Analyzing foreign machinery markets statistically is covered in a pamphlet issued by the Industrial Machinery Division of the Department of Commerce. It includes a classification of industrial machinery arranged by groups and alphabetically, showing the unit of quantity for reporting and the department's class number for type of machine.

FABRICATED STEEL

Awards of the Week Less Than 20,000 Tons and New Work Totals 12,500 Tons

The falling off in structural steel business, reflected in all market reports, is shown by the week's total of awards and inquiries, which in the case of lettings is less than 20,000 tons, while new work up for bids amounts only to 12,500 tons. The largest award was 4400 tons for New York subway work. Awards follow:

Loft building, 230-232 West Thirty-ninth Street, New York, 1000 tons, to Paterson Bridge Co.

Hotel, West Forty-eighth Street, New York, 1000 tons, to Paterson Bridge Co.

The Structural Steel Board of Trade, New York, reports two awards to members totaling 218 tons, as follows: Alterations to Grand Central Terminal, New York, to Atlantic Structural Co., and addition to loft building at 37 West Sixty-fifth Street, New York, to Hay Foundry & Iron Works.

New York subways, section 3, route 102, 4400 tons, to American Bridge Co.

Savings bank, Hartford, Conn., 400 tons, to Bethlehem Fabricators, Inc.

State highway bridge in Virginia over the Rappahannock River, 900 tons, to an unnamed fabricator.

Parker House, Boston, 2500 tons, to New England Structural Co.

New Bedford Cotton Mills Corporation, mill addition, 350 tons, to United States Machinery Corporation, New Bedford.

Dobie Foundry & Machine Co., Niagara Falls, N. Y., addition 100 tons, and addition to mill building, Rochester, name not announced, 100 tons, to Kellogg Structural Steel Co., Buffalo.

Hotel, Detroit, 3000 tons, to Jones & Laughlin Steel Corporation.

Weirton Steel Co., ore bridge, 600 tons, to Heyl & Patterson, Inc., Pittsburgh.

Eitel-Decker Hotel, Chicago, 1175 tons, to Gage Structural Steel Co., Chicago.

Bear traps for dams Nos. 45 and 49, Ohio River, Addlson and Uniontown, Ky., 600 tons, to unnamed bidder.

Electrical Engineers Equipment Co., Melrose Park, Ill., 300 tons to Worden-Allen Co., Milwaukee.

Westinghouse Electric & Mfg. Co., electric lighting standards plant, St. Louis, 300 to 400 tons, to Mississippi Valley Structural Steel Co., St. Louis.

Aurora National Bank, Aurora, Ill., building, 400 tons, to American Bridge Co.; S. M. Siesel Co., Milwaukee, general contractor.

Santa Fe System, car float, 800 tons, to Moore Dry Dock Co., Oakland, Cal.

Prescott School, Oakland, Cal., 125 tons, to Moore Dry Dock Co.

United States Steel Products Co., Los Angeles, warehouse, 200 tons, fabricating to be done in its own plant.

Foundations for Indiana War Memorial, Indianapolis, Ind., 1000 tons, to American Bridge Co.

Cleveland Electric Illuminating Co., Clinton, substation, 100 tons, to T. H. Brooks & Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Central Railroad of New Jersey, four bridges, 500 tons.

Building, Bronx Borough, New York, 600 tons.

Loft building, East Fifty-seventh Street, New York, 800 tons.

Western Maryland Railroad, two bridges, 500 tons.

Delaware, Lackawana & Western Railroad, bridges, 1000 tons.

Apartment building, Philadelphia, 1500 tons.

Highway bridge, South Carolina, 300 tons.

American Sugar Refining Co., warehouse in Brooklyn, 800 tons.

Maine State Hospital, Portland, Me., addition, 625 tons, previously reported 400 tons.

Dayton, Ohio, Williams Street Bridge, 200 tons.

Ford Motor Co., River Rouge spring plant, 2000 tons.

Coolidge Hotel, Seventh Street and Wabash Avenue, Chicago, tonnage not stated.

Burlington Railroad, bridge program, 1500 tons.

Milwaukee Central Continuation School, third unit, 700 tons; bids close March 1.

City of Racine, Root River bridge at Main Street, 350 tons; plans in progress, Strauss Bascule Bridge Co., Chicago, engineer.

Apartment, Laguna Street, San Francisco, 200 tons; bids being taken.

San Leandro Junior High School, Oakland, Cal., 250 tons; Moore Dry Dock Co. low bidder.

Grant Building, San Francisco, addition, 850 tons; Moore Dry Dock Co. low bidder.

Chippewa Theater Corporation, Rochester, N. Y., theater at Buffalo, tonnage unstated.

Rising Sun Avenue bridge, Philadelphia, 350 tons.

Bridge over Raritan River at Clinton, N. J., 230 tons.

Pacific Boiler Works, Bristol, Pa., fabricating plant, 400 tons.

RAILROAD EQUIPMENT

Northern Pacific Inquires for 1000 Automobile Cars and Burlington Wants 500 Hopper Cars

The Northern Pacific has entered the market for 1000 automobile box cars and the Burlington is inquiring for 500 hopper cars. These, with the pending inquiry of the Seaboard Air Line for 3000 to 4500 freight cars, constitute the only prospective freight car buying of importance. Orders for cars and underframes in the last week totaled 840 units. The principal items of the week follow:

The Santa Fe placed 9 diners, 5 cafe observation and 9 lounge cars with the Pullman Car & Mfg. Corporation.

The Northern Pacific has entered the market for 1000 50-ton automobile cars.

The Burlington is inquiring for prices on 500 hopper cars.

The American Locomotive Co. has received an order for 42 locomotives from the Canadian Pacific. They will be built at the Montreal works. The Canadian Pacific has also bought 235 steel underframes from the Eastern Car Co., 315 refrigerator cars, 42 steel car frames and 11 baggage cars from the National Steel Car Co. and 375 coal cars, 74 steel frames and 50 refrigerator cars from the Canadian Car & Foundry Co.

The Minneapolis, St. Paul & Sault Ste. Marie has ordered 100 general service cars from the Pullman Car & Mfg. Corporation.

The Southern Railway has contracted with the Mount Vernon Car Mfg. Co. for the repair of 500 gondolas.

The Southern Pacific is in the market for 23 locomotives. Swift & Co., Chicago, have ordered 300 steel underframes from the Bettendorf Corporation.

The Great Northern is inquiring for 250 freight car underframes.

Scrap Composite Price Drops Sharply

Since early in November there has been a steady decline in the price of heavy melting steel, expressed as a composite of the Chicago, Pittsburgh and Philadelphia markets. During the last month this decline has been much more rapid than in the two months before. The pig iron composite shows no corresponding drop but, on the contrary, a slight elevation. As a matter of fact, the pig iron price has remained for 12 weeks at the highest level it has had in about a year.

The swings in scrap have been considerably more abrupt than those in pig iron. Another thing, scrap has turned both upward and downward somewhat in advance of the turning of pig iron. This predicting, so to speak, has anticipated the pig iron movement by from one to three months, but scrap has been going down now for three months (it has lost about \$2) without any similar movement on the part of pig iron.

At the regular February meeting of the Indianapolis chapter of the American Society for Steel Treating, J. M. Watson, metallurgical engineer Hupp Motor Car Co., Detroit, discussed the subject "Manufacture and Heat Treatment of Automobile Parts." G. M. Williams, president Nordyke & Marmon Co., Indianapolis, will follow Mr. Watson.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

Feb.	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
	Lake	Electro- lytic*	New York	New York	St. Louis	New York	St. Louis
10.....	14.50	14.12½	64.00	9.25	9.10	8.22½	7.87½
11.....	14.50	14.12½	64.00	9.15	9.00	8.15	7.80
13.....	14.50	14.12½	64.00	9.15	9.00	8.10	7.75
15.....	14.50	14.12½	64.50	9.15	9.00	8.12½	7.77½
16.....	14.50	14.12½	64.25	9.15	9.00	8.10	7.75

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Feb. 16.

The markets are quite generally inactive, due partly to the effect of the holiday at the end of last week. Copper prices are higher, but buying has tapered off. After considerable activity the tin market is quiet at higher prices. The only change in the lead market has been a reduction in prices. Decided weakness has developed in zinc, with quotations the lowest in many weeks.

Copper.—The combined effect of the probable formation of a new export association and the bidding of speculators, who were evidently caught short of the metal a week ago, has been a further strengthening of the entire market, accompanied by considerable buying since the purchases noted last week. The market was fairly active up to the holiday on Feb. 12, but since then, particularly yesterday and today, it has been quite inactive. After advancing to 14.37½c., delivered, electrolytic copper has remained firm at that level, despite an absence of interest by consumers. It is intimated that possibly a small amount of metal could be bought today at slight concessions from this price, but there is no fair test of the market reported. Mills are understood to be well filled with orders and exceedingly busy, and it is evident that the heavy purchases in the past two weeks have put both consumers and producers in a comfortable position. The publication of January statistics reveals an increase in stocks of refined metal of a little more than 8000 tons, but this was offset partly by a decrease in production of about 5000 tons. There is also the factor that shipments were less because of the bad weather. The market is firm with all producers quoting 14.37½c., delivered, for electrolytic copper, with Lake copper at 14.50c., delivered.

Tin.—For the four days ended with Thursday, Feb. 11, about 600 tons was sold, mostly by dealers. Yesterday, however, very large sales were reported estimated anywhere from 800 to 1000 tons. Deliveries involved all positions from March to quite distant delivery. The bulk, however, was mostly for nearby positions, or March and April delivery. Consumers absorbed the nearby metal and dealers replaced this by purchases of future shipment. A feature of the market is the continued scarcity of spot Straits, which still commands a considerable premium over futures, the average being about ¾c., with March delivery selling at 63.75c. After the activity of yesterday the market today was exceedingly dull with spot Straits quoted at 64.25c., New York, largely nominal. Quotations in London today were about £3 per ton higher than a week ago, with spot standard quoted at £287 15s., future standard at £280 10s. and spot Straits at £289 15s. The Singapore price was £287 10s. A feature is the large premium for spot standard over future standard of about £7 per ton. Arrivals thus far this month have been 3270 tons, with the quantity afloat 6365 tons.

Lead.—The feature of the market was the reduction by the leading interest of its contract price on Feb. 11 from 9.25c. to 9.15c., New York. This is the first change since Dec. 8. The change is reported to have been necessitated to prevent the importation of Mexican pig lead which was available at 9.40c., New York.

Prices at St. Louis are slightly easier at 9c. to 9.05c., in the outside market. Demand for February and March metal is reported as good, with consumption still approximately equal to production.

Zinc.—Statistics for January showed an increase in stocks of a little over 5000 tons, bringing the amount in smelters' hands on Feb. 1 to about 14,300 tons. As this total is no more than enough for two weeks' consumption, the effect on the market is not important. Within the week the market has further declined until prime Western zinc is quoted today at 7.75c., St. Louis, or 8.10c., New York, for March delivery. Demand is reported as almost negligible, although an inquiry for 300 tons from a galvanizer is reported today. Consumers are buying very little, largely because of a decrease in demand for galvanized sheets and other products.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

Antimony.—Only moderate activity pervades the market for Chinese metal, with prompt metal available at 21.37½c., New York, duty paid, and February-March shipment from China at 20.50c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable as ingots at 27c. to 28c. per lb., delivered.

Old Metals.—The market is firm and business is good. Dealers' selling prices, in cents per lb., are as follows:

Copper, heavy and crucible.....	13.75
Copper, heavy and wire.....	13.00
Copper, light and bottoms.....	12.00
Heavy machine composition.....	10.00
Brass, heavy.....	9.00
Brass, light.....	7.75
No. 1 red brass or composition turnings..	9.25
No. 1 yellow rod brass turnings.....	9.375
Lead, heavy.....	8.50
Lead, tea.....	7.00
Zinc.....	5.50
Cast aluminum.....	20.50
Sheet aluminum.....	20.50

Chicago

FEB. 16.—As the result of a substantial buying movement copper has advanced. Tin is also showing greater strength and is quoted 1¼c. above the price which prevailed during the previous week. Lead is somewhat weaker and zinc has eased off, due to a quiet market and the fact that production is substantially ahead of consumption. Antimony remains unchanged in a quiet market. The old metal market is without feature and prices are unchanged. We quote, in carload lots: Lake copper, 14.75c.; tin, 64.25c.; lead, 9.15c.; zinc, 7.85c.; in less than carload lots, antimony, 24c. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.25c.; red brass, 9c.; yellow brass, 8c.; lead pipe, 8c.; zinc, 5.25c.; pewter, No. 1, 37c.; tin foil, 44c.; block tin, 52c.; aluminum, 20c.; all being dealers' buying prices for less than carload lots.

Non-Ferrous Rolled Products

All brass and bronze products were advanced ¼c. per lb. as of Feb. 5. So also were copper products. Zinc and full lead sheets have not been changed in eight weeks. For New York warehouse prices see page 542.

List Prices Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight Up to
75c. Per 100 Lb. Allowed on Shipments
of 500 Lb. or Over

Sheets	
High brass.....	19¼c.
Copper, hot rolled.....	22¼c.
Zinc.....	12c.
Lead (full sheets).....	13c.
Seamless Tubes	
High brass.....	23¼c.
Copper.....	24½c.
Rods	
High brass.....	16¾c.
Naval brass.....	19¾c.
Wire	
Copper.....	16½c.
High brass.....	19¾c.
Copper in Rolls.....	21¾c.
Braced Brass Tubing.....	27¼c.

PERSONAL

Fred H. McIsaac has been elected president Kirk-Latty Mfg. Co., Cleveland, manufacturer of bolts, nuts and rivets, to succeed the late Samuel D. Latty. Mr.



F. H. MC ISAAC

McIsaac retains the position of treasurer of the company, which he has held for a number of years. He was born in Detroit in 1884. In 1901 he entered the employ of the Kirk-Latty Mfg. Co. as an office boy, worked up through various clerical positions, both in the factory and the office, and in 1909 was made office manager. About 1910 he became assistant treasurer, and about two years later treasurer of the company. Since 1916 he has been active in the executive end of all branches of the business. He gained a wide business experience through his long association with Mr. Latty, under

whose direction a large business was built up from a small beginning. Mr. McIsaac is vice-president of the American Hardware Manufacturers Association, and has a wide acquaintance with jobbers and manufacturers, owing to his activity in convention work in that and other associations. He is a member of the American Iron, Steel & Heavy Hardware Association, the National Association of Farm Equipment Manufacturers, the National and Southern Supply & Machinery Dealers Associations, National and Southern associations of stove manufacturers, National and Southern hardware jobbers associations.

G. E. Randles, president Foote-Burt Co., machinery manufacturer, Cleveland, has been elected president of the American Plan Association of that city. P. E. Bliss, vice-president Warner & Swasey Co., is vice-president and F. G. Houdell, president Chain Products Co., Cleveland, is treasurer.

J. Morris Ireland, who has been manager since 1924 of the industrial department of the Cleveland office of the Westinghouse Electric & Mfg. Co., has been appointed Cleveland sales manager of that company, succeeding John Andrews, Jr., who has been made manager of the Detroit district, as noted in our issue of Jan. 28. Mr. Ireland has been connected with the Westinghouse company in Cleveland for 15 years, starting as a supply salesman. In 1914 he was transferred to the central station division and in 1919 to the industrial section, in which capacity he looked after the steel mill customers in the Cleveland territory.

E. A. C. Baum has been appointed assistant western representative for steel sales for Henry Disston & Sons, Inc., Philadelphia. He will have headquarters at the Disston Chicago branch, 111 North Jefferson Street. Mr. Baum formerly was metallurgical engineer with the Illinois Tool Works, 2515 North Keeler Avenue, Chicago.

George H. Charls, president United Alloy Steel Corporation, Canton, Ohio, will address the Industrial Division of the Cleveland Advertising Club, Feb. 23, on "What Our Years of Industrial Advertising Have Taught Us."

F. M. Burt, recently employed as an enamel specialist with the Trumbull Steel Co., and formerly con-

nected with the Carborundum Co., has joined the sales force of the Massillon Refractories Co., Massillon, Ohio. He will be located at Pittsburgh and will have charge of the placing of "Alumite" refractories in the vitreous enameling industry.

H. H. Snell, formerly manager of the gear department for Charles Bond Co., Philadelphia, has been appointed as district representative for Foote Brothers Gear & Machine Co., Chicago. His territory covers eastern Pennsylvania, Delaware, Maryland and the southern half of New Jersey.

C. E. Neudorfer, formerly general manager Standard Tank Car Co., Sharon, Pa., and previously with the Riter-Conley Co., has become associated with the William K. Stamets organization, Pittsburgh.

L. J. Jones, secretary and formerly assistant treasurer, Eastern Rolling Mill Co., Baltimore, has been elected vice-president of the company and T. H. Stevenson has been elected assistant treasurer.

Noah F. Young, president and treasurer Lumen Bearing Co., Buffalo, has been reelected to these positions and named general manager as well. C. H. Bierbaum was at the same time elected vice-president and Nathaniel K. B. Patch secretary. The directors, in addition to the above, are A. G. Bartholomew and Samuel Ellis.

W. C. Prendergast has been elected vice-president in charge of sales of the Penn Seaboard Steel Corporation, 1417 Sansom Street, Philadelphia.

Harry Muschenheim, who has been associated with N. & G. Taylor Co. for the past 14 years selling bars, is now connected with the Penn Seaboard Steel Corporation, Philadelphia. This company has recently installed a bar mill at its New Castle (Del.) plant, designed to roll a wide range of sizes.



H. MUSCHENHEIM

J. L. Hilton, for the past three years general superintendent and sales manager of plate fabricating division of the Heltzel Steel Form & Iron Co., Warren, Ohio, has resigned. His address is 1102 North Elm Street, Warren.

William A. Gayou has been appointed structural and plate sales agent for the Bethlehem Steel Co. at St. Louis. He was with the Midvale and Cambria Steel companies 11 years, and then continued with Bethlehem when that company took over the former concerns.

G. A. Richardson, manager of technical publicity for the Bethlehem Steel Co., gave a lecture illustrated with moving pictures before the St. Louis Railway Club on Feb. 12, on "A Century of Progress in Car Building."

Dr. F. C. Langenberg, metallurgist Watertown Arsenal, Watertown, Mass., spoke before the Hartford chapter, American Society for Steel Treating, last week, in Hartford, his subject being cold working of forgings.

C. W. Sisson, secretary Heating and Piping Contractors' Association of Boston, has resigned to become representative of the Illinois Engineering Co., Chicago, steam and vapor specialties.

Stewart M. Marshall, Perin & Marshall, consulting engineers, New York, returned Monday from Europe, where his travels took him as far as Russia. Frank L. Estep, of the firm, who accompanied Mr. Marshall part of the way, is scheduled to arrive before the end of the week.

Bertram S. Stephenson, for years identified with the M. A. Hanna Co., part of the time in Pittsburgh and for the last several years at Detroit, has been appointed director of purchases of the American Radiator Co., with headquarters at Buffalo.

S. D. Moxley has been appointed chief engineer of plant, American Cast Iron Pipe Co., Birmingham, Ala., vice James W. Moore, recently made general works manager. Mr. Moxley is a graduate of the University of Alabama and was three years ago connected with the Tennessee Coal, Iron & Railroad Co. Jesse W. Stalcup has been made auditor of the Pipe company, vice C. O. Hodges, who has been advanced to treasurer. Mr. Stalcup has been with the company since 1908.

Parker F. Wilson, who recently joined the organization of the Wheeling Steel Corporation, has been made assistant to President I. M. Scott. Mr. Wilson has been engaged in operating capacities for a number of years and more lately was vice-president and general manager of the Otis Steel Co., Cleveland.

C. C. Ostrom, who for some time has been sales agent in the Philadelphia district for the Vulcan Mold & Iron Co., Latrobe, Pa., manufacturer of ingot molds, has been elected president of the Foster-Merriam Co., Meriden, Conn., castings manufacturer. He will enter upon his new duties March 1.

Passing of the One-Man Concern

A measure of the speed with which the "one-man" concern, or partnership firm is vanishing from the field of industry can be gained by the following figures, compared from census reports by the National Industrial Conference Board, 247 Park Avenue, New York, for respective five-year periods from 1904 to 1919, indicating the increasing extent of industrial activity of corporations as compared with that of individually, partnership-owned and other forms of organization:

Corporations employed, of all wage earners in industry, in

1904.....	70.6 per cent
1909.....	75.6 per cent
1914.....	80.3 per cent
1919.....	86.5 per cent

Measuring the value of commodities produced by corporations, their output during the same period of years constituted the following proportion of the value of all manufactured articles:

In 1904.....	73.7 per cent
In 1909.....	79.0 per cent
In 1914.....	83.3 per cent
In 1919.....	87.7 per cent

The total of salaries and wages paid employees progressively increased from \$3,184,884,275 in 1904 to \$13,425,771,834 in 1919, an increase of 321.5 per cent, while the total "value added by manufacture" increased during the same period from \$6,293,694,753 to \$25,041,698,490, an increase of only 297.8 per cent; or a proportionate increase of salaries and wages of from 50 per cent of total value of manufacture in 1904 to approximately 54 per cent in 1919, showing wages and salaries growing at a faster rate than the value of manufacturing output.

Bituminous coal production, so far in the present coal year (beginning Aug. 1), has been 448,054,000 tons, compared with 394,519,000 tons in the corresponding period of the previous year. The current figure is somewhat above the average of the six preceding years, which stood at 430,412,000 tons.

OBITUARY

WALTER BOHRER, president and treasurer Monarch Tool & Mfg. Co., Cincinnati, died at his home in that city on Feb. 10, following a brief illness. He had been associated with the company for the past 17 years.

ALFRED E. COLEMAN, vice-president and director of the W. Bingham Co., Cleveland, iron, steel and hardware jobber, died unexpectedly at the home of his sister in Oakland, Cal., Jan. 30. He was 62 years old.

WILLIAM C. MUNDT, president Charles Mundt & Sons, dealers in perforated metals, 53 Fairmount Avenue, Jersey City, N. J., died suddenly in the Royal Poinciana Hotel, Palm Beach, Fla., recently. Mr. Mundt was born in New York 47 years ago. He had been president of his company for nearly 12 years.

EMERY VOSE, for a number of years superintendent at the De Kalb, Ill., North and South Works of the American Steel & Wire Co., died at De Kalb on Feb. 3. Funeral services were held in Waukegan, Ill., his former home.

JAMES HIGBIE POLHEMUS, mining engineer in charge of mines of the New Jersey Zinc Co., died Feb. 10 at his home, 175 Wildwood Avenue, Upper Montclair, N. J., at the age of 42. He was a native of East Orange and was graduated from the Massachusetts Institute of Technology in 1906. For several years before joining the New Jersey company he was mining engineer for the American Lead, Zinc & Smelting Co. He belonged to the American Association of Mining Engineers, Mining and Metallurgical Society of America, the American Refining Congress and the Holland Society of New York.

GORDON H. FRASER, well known in the British iron and steel industry, died suddenly last week, following an operation. Mr. Fraser, who was 49 years of age, was managing director of Pearson & Knowles Coal & Iron Co., Ltd., Warrington, England; chairman of the board of Burnell & Co., Ltd., Ellesmere Port, near Birkenhead, England, and a member of the Iron and Steel Institute since 1920.

J. W. DUERR, assistant sales manager, the McMyler Interstate Co., Bedford, Ohio, died Feb. 14 at the age of 45. He had been connected with the company for 20 years.

B. BRIARD, purchasing agent since 1909 for the Chicago Great Western Railroad, died at Chicago, on Feb. 10, following an operation for appendicitis. Mr. Briard was born at St. Louis Feb. 9, 1865, and was educated in the public schools of that city. He entered railroad service in 1879 as a messenger boy in the Chicago freight office of the Chicago & Alton and in 1882 he was transferred to the purchasing department of that railroad. For a number of years he had made his home at Oak Park, Ill. He is survived by Mrs. Briard and three married daughters.

"Compressibilities of Gases" is the title of miscellaneous publication No. 71 of the Bureau of Standards. It contains graphs for computing the compressibilities of air, argon, helium, hydrogen, neon, nitrogen and oxygen and for computing the volumes delivered from cylinders containing some of these gases at high pressures. It was prepared by S. F. Pickering, associate chemist of the bureau.

REINFORCING STEEL

Awards Total 4110 Tons and New Work in Market Amounts to 3600 Tons

A number of small projects, together with 1200 tons of foreign reinforcing bars for two school buildings in Philadelphia, make a total of 4110 tons for which contracts have been placed within the last week. A warehouse in Detroit requires 1000 tons which, combined with other smaller projects, makes a total of 3600 tons of new jobs in the market. The awards follow:

Lansing Apartment, Chicago, 200 tons of rail steel, to Inland Steel Co.

Waterworks reservoir, Racine, Wis., 300 tons, to Turner Co., Minneapolis, Minn.

Antone Hotel, 17 East Ohio Street, 300 tons of rail steel, to Inland Steel Co.

Midwest Athletic Club, Chicago, 170 tons, to Barton Spiderweb System, Inc.

Security Bank Building, Waukegan, Ill., 200 tons; Jacob Kulp Building, Chicago, 300 tons; Astor Street cooperative apartments, Chicago, 170 tons; N. Shure Building, Chicago, 200 tons, all to Olney J. Dean & Co.

Newport Finance Co., Newport, Ky., building, 100 tons, to Pollak Steel Co.

Isolation Hospital, St. Louis, 80 tons, to Laclede Steel Co., St. Louis.

Harmon Safe Co., San Francisco, 140 tons, to unnamed local jobber.

Camlin Apartments, 150 tons, and Mehan Garage, 100 tons, Seattle, Wash., to Pacific Coast Steel Co., San Francisco.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

Chicago Board of Education for Christopher School, Campbell and Fifty-first Streets, 100 tons.

Apartment hotel, 6324 North Western Avenue, Chicago, 100 tons.

Webster Arms Hotel, Chicago, 400 tons; Hooper & Janush, architect.

Illinois State road work, 800 tons.

Indiana State War Memorial, Indianapolis, tonnage unknown, general contract for foundation work to E. C. Strathmann Co., Indianapolis.

Filtration plant, municipal waterworks, St. Louis, 400 tons.

Robert Gair Co., factory, Piermont, N. Y., 300 tons; general contract awarded to Turner Construction Co.

Tibbets Brook Park swimming pool, Westchester County, N. Y., park commission, 100 tons; general contract awarded to Schuttler-Vandern Co., New York.

Lorillard tobacco factory, Richmond, Va., 400 tons.

Warehouse in Detroit, 1000 tons.

Two schools in Philadelphia, 1200 tons, to F. R. Phillips & Sons Co.; William Cramp & Sons' Ship & Engine Building Co., general contractor.

Building at Tappahannock, Va., 400 tons, to Carnegie Steel Co.

Court Square Building, New York, 100 tons, to McClintic-Marshall Co.

Sharon Steel Hoop Co. Report

In his annual statement to shareholders, Severn P. Ker, president Sharon Steel Hoop Co., Sharon, Pa., shows that total expenditures for items charged to capital account during 1925 amounted to \$957,308, and there was deducted on account of obsolete and abandoned equipment, \$192,742. The sheet mill plant is now fully electrified and equipped with modern and efficient furnaces. A new shear building 70 x 500 ft., served with electric cranes, has been completed. Installation of a new electrical power house is completed. It is expected during 1926 to complete the electrification of the Sharon property and to install more modern equipment in other departments.

Sales of semi-finished and finished steel last year amounted to \$20,005,625, involving 319,207 tons. Net profits totaled \$511,414, equivalent after the preferred dividend to \$1.50 per share on the 285,940 shares of common stock outstanding. This net compares with \$490,714 in 1924 and with \$1,731,269 in 1923. The deficit had been reduced at the close of 1925 to \$1,129,952, from \$1,688,573 at the close of 1924.

Gross earnings were \$1,779,476, after the expenditure of \$1,599,854 on repairs and maintenance. From the gross were deducted \$896,144 for depreciation, \$308,020 for interest and \$63,898 for federal taxes. The depreciation charge was above 6 per cent on the property item of \$14,911,581.

War Claims of Seattle Company Go to Supreme Court

The United States Supreme Court has granted the petition of the Skinner & Eddy Corporation, former shipbuilder of Seattle, for a review of the evidence presented before the Supreme Court of the District of Columbia, in a suit for a mandamus order compelling the comptroller general to pass on a claim for war-time contract work done for the United States Shipping Board during the World War.

The company has claims pending against the Government for shipbuilding work done during the war to the amount of \$3,260,032. These claims were presented to the comptroller general some months ago, but he refused to consider them, with the result that the Skinner & Eddy company sought an order of mandamus compelling the comptroller general to pass on the claims, which was denied by the Supreme Court of the District of Columbia. The evidence will now go to the United States Supreme Court.

Industrial Items

The Bearings Co. of America, Lancaster, Pa., has been purchased by a group of Philadelphia capitalists who are planning to expand the plant and increase the field of its endeavors. Final transfer of all of the stock of the Bearings company will be made March 15. Frank H. Germane, formerly of the Gilliam Mfg. Co., and now of the Timken Roller Bearing Co., will become president of the new organization, with headquarters in the Bullitt Building, Philadelphia. Mr. Germane brings to the Bearings company a wide contact with bearings users, especially in the automotive field. The personnel of the Bearings company will not be changed. Jack L. Straub will remain as vice-president in charge of operations. It is expected that the combination thus effected will be one of unusual strength in the ball-bearing field.

The Pittsburgh Steel Co., Pittsburgh, recently started the production of a new style of poultry fence known as Columbia Chictite fence. This is a hinge-joint type of fence with several of the lower line wires spaced only one inch apart which is close enough to confine small chickens and keep out destructive animals. In making this fence an entirely new engineering principle of fence weaving is employed. This overcomes the difficulties heretofore encountered in other efforts to make a hinge-joint type of fence with closely spaced line wires, and produces effective, tightly wrapped joints with line wires only one inch apart. It is made in Nos. 14½, 15½, 17 and 18 gage, stay wires 6 in. apart and heights of 34, 48, 60 and 72 in. It is also made in the No. 17 gage weight with stay wires 4 in. apart and in five heights from 24 to 72 in. All styles are put up in 10 and 20 rod rolls. Like all other fences made by this company, "Chictite" fence is Super-Zinc—so-called, that is, protected by a heavy zinc coating.

Growth in the furnace business of the Chapman-Stein Furnace Co., Mt. Vernon, Ohio, during the past two years has made it necessary to enlarge the organization. Office space is being increased and the drafting room practically doubled. The company reports some large recuperative continuous furnace contracts from the steel industry. Among these are two furnaces for the Illinois Steel Co., South Chicago. For the glass industry the company is building recuperative day tanks and pot furnaces.

The Newton Foundry Co., Barberton, Ohio, which recently took over the plant of the Semi-Steel Foundry at Barberton, has been incorporated for \$50,000. A. M. Hall, who was formerly superintendent of the Wellman-Seaver-Morgan Co., foundry, is president; Oscar Hackenberg, vice-president; John Donald, secretary, and J. B. Binn, treasurer. The company is now in active production of gray iron castings. A new pattern shop has been added to the plant.

NEW TRADE PUBLICATIONS

Pressure Blowers and Exhausters.—American Blower Co., Detroit. Bulletin 1608 of 16 pages illustrates and describes blowers for delivering air at high pressures. They are built in standard sizes and may be driven either by belt or direct-connected motor. Capacity tables and clearance diagrams are given.

Steam Turbine Generators.—General Electric Co., Schenectady. Bulletin GEA-54 of 44 pages illustrates large numbers of turbo-generator units in power plants scattered all over the United States and some abroad. It features the Curtis turbine, of the impulse type, with constant pressure in each stage, and forms an attractive book of pictures.

Are Welders.—General Electric Co., Schenectady. Bulletins GEA-9 and GEA-255 are devoted respectively to welding outfits driven by a gas engine and portable welding outfits driven by belt or motor. Distinctive features and specifications are given in some detail.

Forged and Cast Ball Valves.—Wilson-Snyder Mfg. Co., Pittsburgh. Four-page folder covering solid and hollow balls for pump valves, ranging from 3 to 6½ in. in diameter, and made of bronze, forged steel, chrome (stainless) steel and cast iron. The solid balls range from 3 to 4½ in. in diameter and the hollow balls from ½ to 6½ in.

Type-D Mine Fans.—American Blower Co., Detroit. Bulletin 3313 of two pages briefly describes fans for handling large volumes of air economically. A disk type of rugged construction is shown, with dimensions, capacities, etc.

Caterpillar 5-Ton Tractor.—Caterpillar Tractor Co., San Leandro, Cal. Catalog of 16 pages describing in some detail the construction and uses of a tractor for road builders, loggers, farmers, and others. One feature claimed is the accessibility and the ease of making adjustments.

Centrifugal Air Compressors.—General Electric Co., Schenectady, N. Y. A four-page illustrated bulletin regarding the company's single-stage centrifugal air compressors, designed for a variety of purposes and largely used in the metallurgical industries in connection with annealing furnaces, tempering furnaces, forging furnaces, core ovens, sintering, pneumatic conveying, ore melting, etc.

Electric Motors.—The Wagner Electric Corporation, St. Louis. A 12-page illustrated bulletin on wound-rotor, slip-ring, polyphase motors, which are designed for constant speed service where the starting duty is light and infrequent.

Phosphor Bronze.—American Brass Co., New York. A 4-page bulletin descriptive of Anaconda phosphor bronze which is now manufactured by this company in the form of sheets, seamless tubes, wire and rods.

Lift Trucks.—Barrett Cravens Co., 1328 West Monroe Street, Chicago. Catalog of 16 pages and some 50 illustrations of lift trucks in use in various industries, including information on applications and savings.

Speed Reducers.—De Laval Steam Turbine Co., Trenton, N. J. Booklet of 16 pages describing worm reduction gears of horizontal and vertical shaft and double reduction types, also helical gears for low ratios and double helical gears for high power service. Illustrations include many colored views showing oiling system and other details.

Speed Reducers.—Boston Gear Works Sales Co., Norfolk Downs, Mass. Booklet of 36 pages under the title of "Modern Speed Reduction." "Standardized" reduction units of helical and worm gear types are described, dimensions of various sizes, motor and bed plate data, and list prices being included.

Pumps.—De Laval Steam Turbine Co., Trenton, N. J. Leaflet of four pages describing layout of the water supply system of the city of Tulsa, Okla., including the turbine driven centrifugal pumps installed.

Concrete Bars.—Concrete Steel Co., 42 Broadway, New York. Catalog describing in detail Havemeyer bars and building products manufactured by that company.

Chain Drives and Sprockets.—Diamond Chain & Mfg. Co., Indianapolis. How to lay out a chain drive, what it should do, how to select proper chains and sprockets, tables of useful data and description of Diamond Roller

Chains; 84 page illustrated booklet of real engineering value.

Switching Equipment.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. A 112-page publication, 1541-C, describing the proper switching equipment for alternating current power stations. The publication deals with the general fundamentals that should be borne in mind when laying out a switchboard, and describes in detail the various types of switching equipment. It is profusely illustrated with diagrams and half-tone illustrations. The choice of switching equipment arrangement is described, and with it are included switching devices and classes of stations of both the single and double-bus systems. Safety enclosed switchboards, and the direct control switchboard for 2500 volts, or less, with oil circuit breakers and bus bars supported from the back, are explained.

Automatic Switching Equipment.—General Electric Co., Schenectady. Bulletin No. GEA-295, 23 pages. Describing the application of automatic switching equipment to hydro-electric generators, hydro-railway, mining and industrial, central station and other service. There are a number of illustrations.

Concrete "Buster."—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Bulletin 81-1 of 12 pages is devoted to an air-driven tool for breaking up concrete, either in roads or in building or other foundations. It may be used for cutting out reinforcing bars and for shallow rock drilling as well.

Metallography.—Bausch & Lomb, Rochester, N. Y. Pamphlet describing metallographic equipment made GHI-SAA, with inverted microscope permanently aligned with illuminant.

Outstanding examples of profitable gear cutting are presented in an attractive booklet published by the Fellows Gear Shaper Co., Springfield, Vt., under the title of "Put Money in Your Purse." There are 30 pages 6 x 9 in., and the illustrations are wood cuts. Space is devoted to the economical cutting of gears with taper holes, transmission countershaft gears, three-step gears, small shank pinions, shank gears, non-metallic gears, brass pinions and gears, segment and internal gears and a one-piece helical gear and worm. Data relating to large increases in production of spur gears and other types are also given. Advantages of the company's high-speed gear shaper are briefly enumerated and the arrangements for cutting shank, internal and segment gears and for cutting cams are illustrated.

Much useful information is given in "The Carbon Electrode," a book of 115 pages, 4 x 7 in., published by the National Carbon Co., Inc., 30 East Forty-second Street, New York. Sections are devoted to a brief history of the electric furnace, the history, manufacture, characteristics and use of the carbon electrode. Data on continuous electrodes, methods of handling and storage, joining of carbon electrodes, and methods of securing minimum electrode consumption are also included, and the company's resistor carbon, carburite, carbon blocks, paste and other carbon products are described briefly. There is also an electric furnace bibliography, furnace wiring diagrams and several tables of useful engineering data.

The Du Pont Everdur Co., Wilmington, Del., has issued an attractively printed and illustrated booklet describing in detail important facts about "Everdur" metal, its new product. Everdur is a corrosion-resistant alloy with physical properties characteristic of steel, and was developed by the Du Pont company to meet corrosion problems existing in some of its own operations which involved the use of hydrochloric acid. The new metal is described as an alloy of copper, silicon, and manganese of the solid solution type which, because of its homogeneity, is recognized as the type of alloy desirable for resistance to corrosion.

Nearly 12,000 publications, a veritable library of science and technics are listed in the new descriptive catalog of publications of the Bureau of Standards known as Circular 24. They cover every variety of work in the field of standardization and applied measurement, and every paper has had its direct influence upon scientific and technical progress since 1901. Copies of Circular 24 may be obtained by all those having actual use for it upon application to the Superintendent of Documents, Government Printing Office, Washington.

Machinery Markets and News of the Works

RAILROADS ISSUE LISTS

Santa Fe and Rock Island Lines in the Market for Machine Tool Equipment

General Buying in Some Sections Shows a Decline, but the Volume Is Still Fairly Satisfactory

RAILROAD requirements are the center of interest in the machine tool market. The Santa Fe and Rock Island have issued lists at Chicago and the Northern Pacific is expected to send out a list soon. Orders will probably be placed soon by the Illinois Central, Florida East Coast and Chicago & North Western. The

New York Central, the Pennsylvania and the New York Rapid Transit Co. have been buyers.

Although some reports indicate that the volume of machine tool business is declining, there are other reports that orders so far this month show a marked gain over January. Some machine tool builders describe their business as "exceedingly good." A large part of the buying consists of orders for single machines, but some fairly large orders have been placed. The Wood Newspaper Machine Co., Plainfield, N. J., has a buying program which will involve an expenditure of about \$150,000, of which about \$60,000, it is said, will be for milling machines. The Hande Wrench Co., New Bedford, Mass., has bought a dozen or more machines. A manufacturer of electrical equipment bought eight turret lathes.

New York

NEW YORK, Feb. 16.

THE general report is that machine tool business is exceedingly good. Not in some time has there been such active buying in the New York territory. Among the larger buyers is the Wood Newspaper Machine Co., Plainfield, N. J., whose total program calls for the expenditure of about \$150,000, of which one order for milling machines is said to total \$60,000. Other purchasers whose expenditures are running up into many thousands of dollars are the General Electric Co., the Otis Elevator Co., the New York Rapid Transit Co. and the Pennsylvania Railroad. The New York Central Railroad has issued a good many inquiries for individual tools and is placing some orders. The Hande Wrench Co., New Bedford, Mass., has bought nine deep-hole drilling machines, four spline milling machines and a 14-in. engine lathe; the Hartford Arms Co., Hartford, Conn., has bought a rifling machine; the Peters-Morse Adding Machine Co., Ithaca, N. Y., an automatic milling machine; the Taft-Pierce Mfg. Co., Woonsocket, R. I., a 16-in. geared-head lathe; the Westinghouse Electric & Mfg. Co., Newark, N. J., two bench lathes and two bench milling machines.

The Delaware Bay Ship Building Co. has been organized at Leesburg, N. J., with capital stock of \$100,000 and will operate a shipbuilding plant, repair yard and will also have facilities for the storage of yachts. The first unit of the plant has been completed and will be ready for operation March 1. Charles E. Sharp is president.

The Weber & Scher Mfg. Co., Inc., 263 Sussex Avenue, Newark, N. J., has been incorporated to take over a partnership business conducted under the same name. It will continue in the designing and building of special and automatic machinery and is becoming extensively engaged in the manufacture of electrical coil winding machines, both of its own design and of the design of the Varley Duplex Magnet Co., of which the Weber & Scher Mfg. Co. is the sole licensed manufacturer. The Weber & Scher company will discontinue special tool work for outside customers as soon as it has completely adjusted its facilities to the manufacture of the lines above mentioned.

Contract has been let by the Pequot Mfg. Co., Thompson Avenue, Long Island City, manufacturer of corrugated boxes and containers, etc., to the Austin Co. for the first unit of its proposed plant at Glendale, L. I., one-story, 100 x 320 ft., to cost approximately \$500,000 with equipment. Other buildings will be erected later.

The A. C. Chesley Co., 704 East 133rd Street, New York, manufacturer of metal-covered and hollow metal doors and kindred products, is asking bids for a two-story plant, 125 x 180 ft., to cost about \$130,000 with equipment.

The American Smelting & Refining Co., 120 Broadway, New York, plans extensions in its lead mill at Helena, Mont., to increase the capacity about 10 per cent, estimated to cost \$100,000 with equipment.

The Amerada Corporation, 65 Broadway, New York, operating the Amerada Petroleum Corporation and the Amerada Refining Corporation, same address, with oil and gasoline properties and refineries in the mid-continent field in Oklahoma and Kansas, is disposing of a stock issue to total \$9,248,800, a portion of the proceeds to be used for expansion. E. L. DeGolyer is president.

E. P. Doyle, 11 John Street, New York, architect, has plans for a two-story and basement automobile service, repair and garage building, 125 x 150 ft., to cost approximately \$110,000 with equipment.

The Anaconda Copper Mining Co., 25 Broadway, New York, plans the installation of electric hoisting equipment and auxiliary apparatus at its properties at Butte, Mont. Orders for three electric hoists of largest type have been placed, and seven additional hoists will be purchased later.

The Procter & Gamble Co., Port Ivory, Staten Island, N. Y., has awarded a general contract to the J. W. Ferguson Co., 52 Market Street, Paterson, N. J., for the proposed one and four-story additions to its plant, to cost \$2,500,000 with machinery. Henry Manley, 5 East Fifty-third Street, New York, is architect. Headquarters are at Sixth and Main Streets, Cincinnati.

Magnuson & Kleinert, 250 Park Avenue, New York, architects, have filed plans for a two-story automobile service, repair and garage building, 100 x 170 ft., at 1572-86 Bedford Avenue, Brooklyn, to cost \$200,000 with equipment.

The Brooklyn Edison Co., Pearl and Willoughby Streets, Brooklyn, has acquired the property of the Lidgerwood Mfg. Co., with portion of Atlantic Dry Dock Co. site, Ferris Street, fronting on the East River, aggregating 11 acres, for \$700,000, to be used for a new steam-operated electric generating plant. The entire project will cost close to \$2,000,000.

The Hasbrouck Flooring Co., 501 East Seventieth Street, New York, has awarded a general contract to the Beling-Bush Co., Inc., 299 Broadway, for a four-story hardwood mill, 75 x 130 ft., at Long Island City, to cost \$100,000 with equipment. J. Hasbrouck is president.

The United Verde Copper Co., 111 Broadway, New York, will soon begin the construction of an addition to its mill at Clarkdale, Ariz., to cost \$350,000 with machinery.

The Brandberg Coal Co., Van Koyck Boulevard and Ninety-fourth Avenue, Jamaica, L. I., has plans for a new coal storage and distributing plant, with one-story coal pockets, 160 x 525 ft., loading and conveying equipment, etc., to cost \$150,000.

The Crane Market

THE volume of business in overhead and locomotive cranes in the New York district continues small, although there is apparently a fair degree of activity in other sections. Current inquiry is largely confined to single machines. The Erie Railroad, New York, is expected to close this week on a 20-ton locomotive crane, pile-driver. The Barstow Management Association, Reading, Pa., is reported to be obtaining prices on some small electric hoists. The American Radiator Co., Buffalo, is understood to have closed on overhead equipment.

There is still a large volume of pending business in the Pittsburgh district, although some of the recent inquiries have developed into orders in the past week. The Pittsburgh Crucible Steel Co. having awarded the steel for its new bar mill and purchased the electrical equipment is expected to close soon on the three 15-ton cranes on which it has been obtaining prices. The Westinghouse Electric & Mfg. Co. is inquiring for a 5-ton crane for its Sharon, Pa., plant.

Among recent purchases are:

Public Service Production Co., Newark, N. J., two 60-ton, 35-ft. span, 4-motor, overhead cranes for Athenia and Trenton, N. J., sub-stations, from the Cleveland Crane & Engineering Co.

General Electric Co., Schenectady, N. Y., a 3-ton, 23-ft. span, 3-motor, overhead crane for Schenectady, from the Northern Engineering Works.

Delaware, Lackawanna & Western Railroad, New York, a 25-ton, 25-ft. span gantry crane for Newark, N. J., from the Whiting Corporation.

Hudson Valley Coke & Products Co., Troy, N. Y., a 6-ton electric hoist from the Shepard Electric Crane & Hoist Co.

Division of Highways, Columbus, Ohio, a 10-ton gasoline driven, crawl-tread locomotive crane from the Industrial Works.

Nelson J. Cole Sons & Co., Syracuse, Ind., a 14-ton, gasoline driven, crawl-tread locomotive crane from the Link-Belt Co.

Missouri-Portland Cement Co., St. Louis, a 10-ton, gasoline driven, crawl-tread locomotive crane from the American Hoist & Derrick Co.

Western Electric Co., New York, a 1-ton gantry crane for Kearny, N. J., from the Whiting Corporation.

Pittsburgh Rolls Corporation, Pittsburgh, a 30-ton overhead crane with 10-ton auxiliary, from the Morgan Engineering Co.

Weirton Steel Co., Weirton, W. Va., a 10-ton ore bridge from Heyl & Patterson, Inc., Pittsburgh, and a 120-ton ore car dumper from the Alliance Machine Co.

Westinghouse Electric & Mfg. Co., two 3-ton overhead cranes for its St. Louis warehouse from the Northern Engineering Works.

The Board of Education, Central Rural School District No. 1, Croton Falls, N. Y., is considering the installation of manual training equipment in its proposed two-story junior and senior high school to cost \$300,000. Knappe & Morris, 171 Madison Avenue, New York, are architects.

The Tintern Manor Water Co., Elberon, N. J., will build a one-story addition, 50 x 110 ft., to its pumping plant at Newman Springs, near Red Bank, with the installation of pumping machinery to increase the capacity 8,000,000 gal. per day. Elevating and conveying equipment for handling lime, alum, etc., will be installed. The entire project will cost about \$200,000 with machinery.

The Board of Education, Bernardsville Township, Bernardsville, N. J., is considering the installation of manual training equipment in its proposed new high school, to cost \$260,000. Rasmussen & Wayland, 36 West Forty-seventh Street, New York, are architects.

The Public Service Electric & Gas Co., Public Service Terminal, Newark, is completing plans for a new power substation near Athenia, N. J., to cost about \$350,000. The project will be carried out through the Public Service Production Co., an affiliated organization.

Healey & Co., manufacturers of automobile bus equipment, and the Aeromarine Plane & Motor Co., Inc., manufacturer of airplanes, propellers, etc., both with plants at Keyport, N. J., have formed the Healey-Aeromarine Bus Co., Inc., and will manufacture motor buses with direct front wheel drive. The consolidated plant will also manufacture airplane apparatus, motor accessories as well as automobile bodies. The company has about 200 acres adjoining the present works for future expansion.

The Jersey Central Light & Power Co., Morristown, N. J., has purchased 40 acres on the Passaic River in Hanover Township, and will have plans drawn for a new steam-operated electric power house, to cost close to \$200,000 with equipment.

George C. Bergen, purchasing agent, Essex County, Court House, Newark, is asking bids until March 3 for the construction of a power house and complete equipment in connection with the proposed new Hall of Records building for the Board of Freeholders. Gullbert & Betelle, Chamber of Commerce Building, are architects.

Following a fire, Feb. 6, which destroyed a portion of its building and equipment, the Industrial Conveyor Co., South Keyport, N. J., will occupy a portion of the building at Division and Hurley Streets, used in part by the Metal Fabrics Co., and will resume operations at this location. J. Carle Anderson heads the company.

The Parr Metal Products Corporation, 3519 Forty-first Street, Long Island City, N. Y., has been incorporated to manufacture steel bathroom and kitchen cabinets; steel cabinet boxes and conduit boxes for the electrical trade. It will also do sheet metal manufacturing work on contract. The company has purchased most of its equipment and will be on a production basis about March 1. A. A. Parmer is president and secretary and S. Wertenthell is treasurer. Mr. Parmer was formerly vice-president and

Mr. Wertenthell superintendent of the Columbia Metal Box Co., New York.

Catalogs Wanted

Companio Argentina de Hierros y Aceros, Buenos Aires, Argentina, requests American manufacturers of metal-working machinery and equipment to send catalogs.

New England

BOSTON, Feb. 15.

MACHINERY dealers in this district experienced another quiet week, presumably because of a second heavy snow storm within seven days which greatly curtailed salesmen's activities as well as manufacturing in general. Most of the small business booked locally was for new machinery and included three drilling machines to a Greater Boston shop; a 4-ft. radial drill and a high priced precision lathe to an eastern Massachusetts plant; a geared head motor-driven lathe to a central Massachusetts shop; a press and a 300-lb. hammer to other Massachusetts manufacturers. Sales of used equipment possibly are limited for the reason that dealers are fast eliminating prospects who insist in part payment with unused tools, and also because considerable equipment is offered at auction throughout New England. There are a large number of old live inquiries and many new ones engaging the attention of machinery dealers. Most of the new inquiries call for one or two machines, but in the aggregate amount to considerable. New England machine tool builders are securing increased business from other states. Deliveries are becoming a matter of months instead of two and three weeks.

Bids closed last week on alterations to its foundry by the Draper Corporation, Hopedale, Mass., textile machinery. F. P. Sheldon & Sons, 1008 Hospital Trust Building, Providence, R. I., are the architects.

Plans for the erection of a second unit to the Montaup Electric Co., Somerset, R. I., to cost more than \$2,000,000 are being considered. If carried out the capacity of the plant will be increased from 32,000 to 64,000 kw.

The New England Smelting Co., 220 Union Street, West Springfield, Mass., has work in progress on a one-story addition and will soon have the structure ready for equipment. It is reported to cost \$50,000. John W. Donahue, 105 Bridge Street, Springfield, is architect.

The Donegan Auto Body & Specialty Co., 339 Trumbull Street, Hartford, Conn., manufacturer of automobile bodies, etc., is considering rebuilding the portion of its plant destroyed by fire Feb. 6, with loss reported at \$35,000 including equipment.

The Scovill Mfg. Co., Waterbury, Conn., manufacturer

of brass, bronze and other metal products, has acquired the plant and business of the Gilchrist Co., 236 Bank Street, Newark, N. J., manufacturer of soda fountain fixtures and other metal goods. The new owner will operate as a branch of its organization, continuing the plant at Newark. Extensions and improvements are under consideration. E. O. Goss, head of the purchasing company, has been elected president of the Gilchrist organization.

The Progressive Mfg. Co., Torrington, Conn., manufacturer of machine bolts, studs, etc., will proceed with the erection of its one-story addition by day labor, to be 60 x 140 ft., estimated to cost \$40,000 with equipment. William E. Hunt, Torrington, is architect.

The United Electric Power Co., Providence, R. I., is being organized by officials of the United Electric Railways Co., Providence, to take over that property and develop increased power resources. Albert E. Potter, president of the last noted company, will head the new organization.

The Weed Chain Co., State Street, Bridgeport, Conn., manufacturer of steel automobile chains, has awarded a general contract to the Aberthaw Construction Co., Boston, for a one-story addition to cost about \$45,000.

The Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile starting and lighting equipment, has concluded arrangements for the purchase of the similar division of the American Bosch Magneto Corporation, Springfield, Mass., for \$2,500,000. The latter company will continue to manufacture its other lines of equipment, including radio apparatus. The Bosch organization is affiliated with Gray & Davis, Inc., Cambridge, Mass., and it is now proposed to liquidate this latter interest and dispose of the plants at Cambridge and Amesbury, Mass., heretofore given over to the manufacture of the character of equipment noted. The purchasing company will expand operations at its Toledo plant to accommodate the increase. It is also negotiating for the purchase of the De Jon Electric Corporation, Poughkeepsie, N. Y., manufacturer of kindred automobile apparatus, and with this acquisition will have assets aggregating \$15,000,000. Clement O. Miniger is president of the Auto-Lite company.

The J. P. Nielsen & Son Co., 86 Maple Street, Hartford, Conn., has plans under way for a two-story automobile service, repair and garage building, 100 x 300 ft., to cost \$140,000 with equipment.

The Dettenborn Woodworking Co., 337 Sheldon Street, Hartford, Conn., has filed plans for a one-story addition to cost \$20,000.

W. F. Lacey & Sons, Mystic Avenue, Medford, Mass., manufacturers of automobile truck bodies, etc., have completed plans for a two-story addition, 65 x 100 ft., estimated to cost \$45,000, for which foundations will be laid at once. A portion of the structure will be equipped as a forge and blacksmith shop.

The Eastern Plumbing Supply Co., 80 Market Street, Hartford, Conn., is negotiating for property on the Boulevard, as a site for a three-story storage and distributing plant, 85 x 150 ft., with shop for pipe-cutting, threading, etc., estimated to cost \$80,000.

The Atlantic Public Utilities, Inc., Caribou, Me., is disposing of a stock issue of \$500,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. It also operates properties at Millbury and Grafton, Mass., and vicinity. Arthur S. Dewing is president.

Philadelphia

PHILADELPHIA, Feb. 15.

CONTRACT has been let by Joseph Hyman & Sons, Tioga and Livingston Streets, Philadelphia, scrap iron and metals, to the John N. Gill Construction Co., 121 North Broad Street, for a one-story machine shop to cost \$30,000.

The Board of Education, Philadelphia, will soon award contracts for two new four-story junior high schools, each to cost about \$1,300,000. It is proposed to install manual training equipment. Plans are under way for a third junior high school, with manual training department, to cost approximately \$1,000,000, for which bids will be asked in 60 to 90 days. Irwin T. Catherine is architect for the board.

The Department of Public Works, Bureau of Water, Philadelphia, has plans for an addition to the water station and filter plant at Ford Road and Belmont Avenue, to include the installation of mechanical filters, pumping machinery and accessory equipment, to cost \$500,000.

The Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, architect, has asked bids for a four-story automobile service, repair and garage building, 70 x 240 ft., to cost \$225,000 with equipment.

The Franklin Sugar Refining Co., 125 South Orianna Street, Philadelphia, has awarded contract to Stone & Webster, Inc., Real Estate Trust Building, for an extension to its refinery, reported to cost \$400,000.

The Essex Rubber Co., Beakes Street and May Avenue, Trenton, N. J., is completing plans for a two-story addition, 50 x 200 ft., to cost about \$150,000, to replace the portion of its plant recently destroyed by fire. Part of the structure will be equipped as a machine shop. H. Brunner is company engineer.

The Board of Education, 16 South Stockton Street, Trenton, N. J., plans the installation of manual training equipment in its proposed senior and junior high schools to be erected at Hamilton, Greenwood and Chambers Streets, to cost \$600,000. Preliminary plans are being drawn by Ernest Sibley, Bluff Road, Palisade, N. J., architect.

The Pennsylvania Wire Glass Co., Pennsylvania Building, Philadelphia, will build a one-story addition to its plant at Dunbar, Pa., 70 x 145 ft., to cost \$175,000 with equipment. Walter Cox is president.

The Penn-Jersey Steel Co., 1450 Ferry Avenue, Camden, N. J., has awarded a general contract to J. D. Hill, 122 Woodlawn Avenue, Collingswood, N. J., for a one-story storage and distributing plant, 70 x 200 ft., to cost about \$20,000 with material-handling equipment, etc.

The Mack International Motor Truck Co., 25 Broadway, New York, has plans for a one-story factory branch at Jefferson Avenue and Sixth Street, Camden, N. J., 200 x 200 ft., to cost \$160,000 with equipment.

The Board of Education, Williamsport, Pa., plans the installation of manual training equipment in its proposed two-story and basement junior high school to cost \$350,000, for which bids have been asked on a general contract. Gullbert & Betelle, Chamber of Commerce Building, Newark, N. J., are architects.

Byron Weston and Guy H. Davies, Carlisle, Pa., have acquired the mill of the Marr-McDonald Paper Co., Mount Holly Springs, Pa., and will take immediate possession. A new company has been organized under the name of the Mount Holly Paper Co., to expand and operate the plant, with the installation of additional machinery.

The Budd Wheel Corporation, Budd Building, Philadelphia, manufacturer of steel automobile wheels, has awarded a general contract to the Wark Co., Philadelphia and Detroit, for its addition on Charlevoix Avenue, Detroit, one-story, 120 x 410 ft., to cost \$250,000 with equipment. Albert Kahn, Marquette Building, Detroit, is architect.

Gulf States

BIRMINGHAM, Feb. 15.

PLANs are under way by the Tampa Thermalene Gas Corporation, 305 Jackson Street, Tampa, Fla., for new works along the line of the Seaboard Air Line Railway. An electric furnace will be installed. The entire project will cost in excess of \$200,000. Ernest Kreher and Robert L. Davis head the company. Linus Wolfe is engineer.

The Marland Refining Co., Ponca City, Okla., has formed the Marland Pipe Line Co., to operate in Texas, with assets totaling \$5,000,000. The new organization has plans for the construction of a pipe line to the Big Lake field, Reagan County, Tex., reported to cost more than \$1,500,000.

The Taylor-Johnson Mfg. Co., Monroe, La., H. T. Taylor, 3003 Lovers' Lane, president, recently organized with a capital of \$60,000, is arranging for the establishment of a plant for the manufacture of automobile lubricators and other automotive apparatus.

The General Utilities & Operating Co., Auburndale, Fla., will erect an addition to its ice-manufacturing and cold storage plant at Perry, Fla., to cost \$30,000.

J. K. Spaulding, Fullerton, La., is planning to purchase a quantity of woodworking machinery for installation in a local plant, including a self-feed rip saw table, saw trimmers and auxiliary equipment.

The Southern Ice & Utilities Co., Santa Fe Building, Dallas, Tex., is disposing of a bond issue of \$3,500,000, a considerable portion of the fund to be used for the acquisition of other ice-manufacturing and cold storage plants in Texas, Oklahoma and Louisiana, with extensions and improvements in several. C. W. Dawley is president.

The Dade County Board of Public Instruction, Miami, Fla., Ray L. Hamon, director of buildings, is making inquiries for vocational equipment for the proposed local high school to be erected at a cost of \$1,000,000.

The Franklin Motor Co., Dallas, Tex., local representative for the Franklin automobile, has work under way on a two-story service, repair and garage building to cost \$80,000. It is proposed to increase the structure to five stories later.

The King Mfg. Co., 230 South Clark Street, Chicago, manufacturer of street-lighting standards, is reported to be considering the construction of a new branch plant at Sheffield, Ala., to cost approximately \$65,000 with equipment.

Houston Brothers, Vicksburg, Miss., have inquiries out for a clamshell bucket, about $\frac{1}{2}$ -yd. capacity.

The Texas Central Power Co., First National Bank Building, San Antonio, Tex., has tentative plans for the construction of a new power house on the Frio River, near Three Rivers, Tex., to cost \$125,000 with machinery. The company recently acquired the plant and property of the Three Rivers Production Co. and will build the proposed new station in that locality.

C. A. Blair & Co., Inc., Kissimmee, Fla., has inquiries out for a suction dredge.

A. J. Wendell, Jackson Street, El Campo, Tex., will build a new cotton compressing plant, 25 x 100 ft., to cost \$65,000 with machinery.

The Newport Tar & Turpentine Co., Pensacola, Fla., will rebuild the portion of its plant recently destroyed by fire, to include a new retort building and the installation of equipment in other departments, estimated to cost \$200,000. J. H. McCormack is general manager.

The Harvest Queen Milling Co., Plainview, Tex., will soon begin the construction of a new seven-story flour mill to replace a structure recently destroyed by fire. It will be equipped with elevating, screening, conveying machinery and is estimated to cost \$150,000. Albert G. Hinn is president, and H. P. Roberts, vice-president.

The Arrow Co., Inc., has been incorporated with capital stock of \$30,000 to manufacture surgical instruments and accessories, but does not intend to engage in active manufacturing for some time. The organization affairs of the company are being handled by Samuel Wolf, 801 Canal-Commercial Building, New Orleans.

The Phoenix Portland Cement Corporation, Birmingham, has been incorporated to construct a cement plant on a 140-acre tract $5\frac{1}{2}$ miles from that city. It will have an initial capacity of 1,300,000 bbl. of cement annually. Two rotary kilns, 330 ft. long and 11 ft. 3 in. in diameter, will be installed. The grinding mills will be 40 ft. long and 7 ft. in diameter. It is expected to have the plant completed by Jan. 1, 1927. R. J. Hawn is chief engineer.

Buffalo

BUFFALO, Feb. 15.

BIDS will be received by the Board of Water Commissioners, Dunkirk, N. Y., until Feb. 26, for pumping machinery, tanks and accessory equipment for a proposed filtration plant and pumping station for the municipal waterworks. The J. N. Chester Engineers, Union Bank Building, Pittsburgh, are engineers.

The Midland Paper Box Co., 72 East Utica Street, Buffalo, is completing plans for rebuilding its two-story and basement plant recently destroyed by fire with loss of about \$45,000. C. A. Jensen is president.

The Spencer Lens Co., 442 Niagara Street, Buffalo, manufacturer of microscopes, precision equipment, etc., has acquired the local plant of the Monarch Knitting Mills, Ltd., Dunville, Ont., for \$250,000. It is four-stories, 50 x 380 ft., and will be used by the new owner for expansion.

The American Radiator Co., 1807 Elmwood Avenue, Buffalo, will soon ask bids on a general contract for a one-story addition at its Standard plant, 22 Roseville Street, 80 x 200 ft., to cost \$35,000. William O'Day is manager of the works noted.

Reorganization plans have been arranged by the Bausch & Lomb Optical Co., Rochester, N. Y., manufacturer of optical products, precision instruments, etc., to include plant and equipment improvements. John Jacob Bausch is president, and Edward Bausch, vice-president and general manager, succeeding George N. Saegmuller.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has awarded a general contract to Lyman S. Peck, Empire Building, Pittsburgh, for its one and two-story machine shop addition, 175 x 192 ft., at the Olean, N. Y., works, to cost close to \$100,000 with equipment. E. O. Wood, Babcock Street, Buffalo, N. Y., is division engineer.

W. P. Stranahan, 15 East Pickham Street, Buffalo, is said to be arranging for the early installation of equipment in a local building for the manufacture of automobile fenders, motor parts, etc., including machine tools, bench tools, etc.

The Rand Kardex Bureau, Inc., Tonawanda, N. Y., manufacturer of office filing equipment and devices, has

acquired a controlling interest in the Safe Cabinet Co., Marietta, Ohio, manufacturer of safes, metal filing cabinets, etc. Operations will be continued at the Marietta plant, as heretofore, and expansion program now under way carried to completion; executive and sales offices will be located at Tonawanda. This is the fourth acquisition of the company in recent months, the others being the Kardex Co., Tonawanda; Library Bureau, Inc., Cambridge, Mass.; and the Globe-Wernicke Co., Cincinnati. J. H. Rand, Jr., is president.

Officials of Deere & Co., Moline, Ill., manufacturers of agricultural implements, have organized, under New York laws, the John Deere Plow Co. of Syracuse, capitalized at \$50,000, to operate a plant in this district.

The Paragon Plaster Co., West Fayette and Nelson Streets, Syracuse, N. Y., is said to have plans under way for rebuilding the portion of its four-story mill recently destroyed by fire, with loss estimated at \$65,000 including machinery.

The Meyer Body Co., Inc., has taken over the business of the Meyer Wagon Works, 216 Elm Street, Buralo. An item in the issue of Feb. 4 erroneously stated that the name of the new corporation was the same as the old name. The Meyer Wagon Works had been engaged for 22 years in the manufacture of ice cream delivery equipment.

Contracts for construction of a tank shop by the Pennsylvania Railroad at Olean, N. Y., have been awarded. The American Bridge Co. will fabricate the steel and Lyman F. Peck, Pittsburgh, will do the other construction work. The approximate cost is \$218,000.

The Porter-Cable Machine Co., Syracuse, N. Y., recently received an order for eight special ball grinding machines for an Eastern steel company.

Pittsburgh

PITTSBURGH, Feb. 15.

SO far February does not promise to be as good a month in point of sales as January, but there is a fairly steady flow of inquiries and with considerable business pending the trade is fairly optimistic.

Bids will soon be asked by the Locomotive Stoker Co., 30 General Robinson Street, Pittsburgh, for a one-story addition, 30x180 ft., to cost \$75,000. Hunting, Davis & Dannels, Century Building, are architects and engineers. A. L. Humphrey is chairman of the board.

The Simplex Engineering Co., Washington, Pa., has contracted with the Soviet Government of Russia for the construction of glass plants in that country for the production of sheet glass, glass utensils and kindred products. The work will be carried out under the direction of the Syndicate of Silicate Industry of Russia, Paul E. Klvgillo, director. The initial plant will cover an area, 800x1800 ft., with administration building, 80x300 ft., and other structures, all of steel construction. Automatic machinery will be installed. The majority of equipment will be purchased in the United States. The entire project will cost \$6,700,000. C. E. Frazier is president of the Simplex company and expects to make a trip to the plant site in March.

The Catholic Diocese of Pittsburgh, Craig and Fifth Avenues, Rt. Rev. H. C. Boyle, plans the installation of manual training equipment in its proposed four-story and basement high school for boys at Fifth Avenue and Boundary Street, to cost \$350,000. E. J. Weber, Knights of Columbus Building, is architect.

The Crist & Schilken Co., 543 Fourth Avenue, Pittsburgh, manufacturer of sheet metal products, has awarded a general contract to the Austin Co. for a new plant, to cost \$50,000 with equipment.

The Auto Top & Radiator Works, Wheeling, W. Va., has tentative plans for rebuilding the portion of its plant recently destroyed by fire, with loss of \$18,000 including equipment.

The Pittsburgh Coal Co. and Associated Companies, Oliver Building, Pittsburgh, have acquired the properties of the Vorhees Estate in the Pomeroy Bend district, near Gallipolis, Ohio, consisting of mines, mining machinery, tipples, etc. The new owners have plans for expansion and betterments, including the installation of additional machinery, tippie equipment, etc., to cost in excess of \$200,000.

The William Penn Garage Co., 616 Webster Avenue, Pittsburgh, has awarded a general contract to the Everett Winters Co., Book Building, Detroit, for its proposed nine-story service, repair and garage, 140x140 ft., to cost \$1,000,000 with equipment. Joseph Mazer is president.

The Ball Brothers Glass Co., West Huntington, W. Va., operating the former local plant of the Schram Glass Co., is said to have preliminary plans for extensions and the installation of additional equipment, estimated to cost \$65,000. The company is operated by the Ball Brothers Co., Muncie, Ind.

The United States Engineer, Huntington, W. Va., is asking bids until Feb. 25 for three clamshell dredging buckets, circular 103; until Feb. 24 for 32 pieces of cold rolled steel shafting, circular 102; and until Feb. 23, for a quantity of pipe fittings, including tees, elbows, unions, etc., and gate valves, circular 100.

The National Armature & Electric Co., Bluefield, W. Va., has asked for bids for a factory, 54x100 ft. Mahood & Van Dusen, Bluefield, are the architects.

Cleveland

CLEVELAND, Feb. 15.

THE volume of machine tool business is fair, showing some improvement over January. Demand is well distributed, with sales largely in single machines. A local manufacturer of turret lathes has booked eight machines from a leading manufacturer of electrical equipment and reports a very satisfactory volume of single tool sales. Some business is coming from manufacturers of automobile bodies and parts, but buying by automobile manufacturers themselves is light. The Foster Bolt & Nut Mfg. Co., Cleveland, will increase its present capacity and is buying bolt heading machinery. In wood-working machinery the Brown & Graves Co., Akron, Ohio, has purchased a motor-driven 10-in. Woods molder. The incandescent lamp department of the General Electric Co., Cleveland, is inquiring for a vertical boring mill.

The Fairchild Engineering Co., Marion, Ohio, manufacturer of conveying and other machinery, contemplates the erection of a one-story machine shop, 60 x 65 ft., and an office building. H. B. Walker is president, and J. B. Bray is secretary.

The Crucible Steel Castings Co., West Eighty-fourth Street, Cleveland, has taken bids for a one-story foundry addition, 100 x 200 ft. W. H. Shepard is president. The George S. Rider Co., Century Building, is the architect.

The city of Wellston, Ohio, is contemplating the erection of a \$100,000 filtration system. Howard K. Bell, 680 McClelland Building, Lexington, Kentucky, is the engineer.

The Firestone Tire & Rubber Co., Akron, Ohio, has commenced the erection of a four-story building, 120 x 150 ft., for warehouse purposes. The Osborne Engineering Co., 7016 Euclid Avenue, Cleveland, is the engineer.

The Cleveland Electric Illuminating Co., Cleveland, has taken bids for a substation at Clinton Road and the Big Four Railroad. It will include a three-story switch house, 56 x 124 ft.; a two-story control house, 34 x 86 ft., and a repair and storage house, 80 x 90 ft. E. J. Cook, 1101 Illuminating Building, is the company engineer.

The city of Cleveland has taken bids for additions and alterations to its Kirtland Street pumping station and screen house, involving an estimated expenditure of \$500,000. Robert S. Hoffman is the city engineer.

St. Louis

ST. LOUIS, Feb. 15.

PLANS are being completed by the Southern Car Wheel Co., Commonwealth Building, Pittsburgh, for its proposed plant and foundry at Goodfellow Avenue and the Terminal Railroad, St. Louis, consisting of two units, each one-story, 80 x 260 ft., and 65 x 225 ft., respectively, to cost \$250,000. Robert & Co., Bona Allen Building, Atlanta, Ga., is engineer. F. C. Turner is first vice-president, in charge.

The Kansas Power Co., Washington, Kan., plans extensions and improvements in its local ice-manufacturing plant, including the installation of additional equipment.

The Arkansas Light & Power Co., Pine Bluff, Ark., is concluding the purchase of about four acres at Russellville, Ark., and will use a portion of the site for a new steam-operated electric power house. Plans are under way for extensions and improvements in other power stations, with transmission system, reported to cost \$1,500,000, in all.

The Century Electric Co., 1827 Pine Street, St. Louis, has purchased property on the Forest Park Boulevard and

contemplates the erection of a new plant for the manufacture of fans, motors and kindred electrical machinery to cost \$150,000.

The American Public Service Co., 72 West Adams Street, Chicago, operating electric power properties in Oklahoma and Texas, is disposing of a bond issue of \$2,500,000, a portion of the fund to be used for extensions and improvements. Martin J. Insull is president.

The Missouri Fire Brick Co., 6100 Manchester Avenue, St. Louis, has acquired property in the vicinity of Vandalia, Mo., and contemplates the construction of a new plant for the manufacture of fire brick and refractories, to cost \$70,000 with equipment.

The Board of Education, Ellinwood, Kan., is considering the installation of manual training equipment in its proposed two-story high school to cost \$150,000, for which preliminary plans are being drawn by Schmidt, Boucher & Overend, Fourth National Bank Building, Wichita, Kan., architects.

The Bay Petroleum Co., Chickasha, Okla., is arranging for the establishment of a local brick-manufacturing plant, with department for tile manufacture, and will purchase equipment. Powell Briscoe is secretary, in charge.

The Western Land Roller Co., Hastings, Neb., manufacturer of road machinery, grading equipment, etc., is contemplating the erection of a new two-story plant, to cost about \$85,000 with machinery. It is expected to begin work in the spring.

The Oil Heat Products Co., 2701 South Broadway, St. Louis, has been incorporated to manufacture oil burners for furnaces, stoves and ranges. James G. Doyle is secretary.

Chicago

CHICAGO, Feb. 15.

RAILROAD interest in the market is again evidenced by the issuance during the week of lists by the Santa Fe and the Rock Island Lines. The Northern Pacific is expected to issue a list within the next few weeks. The Illinois Central, Florida East Coast and the Chicago & North Western inquiries are active, but no tools are reported as having been placed. The International Harvester Co., Chicago, has bought four upright drills and a number of used milling machines. The Nash Motors Co. is still in the market and will buy a planer for its Kenosha plant and production equipment for both the Kenosha and Racine plants. The Beardsley & Piper Co., Chicago, has bought two boring mills, a gear cutter, a gear hobber, a No. 4 milling machine and a grinder. The Link-Belt Co., Chicago, has bought a 2000-lb. steam hammer. Armour & Co., Chicago, bought a 200-ton hydraulic wheel press. The Western Electric Co., Cicero, Ill., is inquiring for a radial drill and a 36-in. lathe. Several frog and switch manufacturers are inquiring for planers.

Prices are unchanged, although somewhat firmer, and it is reported that several makers are contemplating upward revisions on certain types of tools. Sales are about on the same level as during the previous week, while inquiry, influenced largely by railroad activity, is somewhat heavier.

The Santa Fe List

All tools motor driven except where otherwise specified

One 15-in. x 6-ft. engine lathe; alternate bids requested on 18-in. and 20-in. swings.

One 42-in. Bullard, or equivalent, vertical boring mill.

One Barnes, or equivalent, 36-in. belt-driven heavy-duty upright drill press.

One Barnes, or equivalent, heavy-duty, 26-in. sensitive drill.

One Cincinnati, or equivalent, 28-in. heavy-duty, single head shaper, belt driven.

One Niles, or equivalent, 90-in. locomotive journal truing lathe.

One Niles, or equivalent, 100-in. double wheel quartering machine.

Two Monarch, or equivalent, 16-in. x 6-ft. portable engine lathes.

One Barnes, or equivalent, heavy-duty 36-in. sensitive drill.

One Gisholt, or equivalent, universal tool grinder.

One 10-in. floor grinder.

One Cleveland, or equivalent, automatic stud machine, $\frac{5}{8}$ -in. to $1\frac{1}{4}$ -in.

One H. B. Underwood, or equivalent, pedestal milling machine, 6-in. jaws.

One 100-lb. upright Bradley, or equivalent, steam hammer.

Five Ransom, or equivalent, 24-in. x 3-in., double dry grinders.

One H. C. Barr, or equivalent, style B, four-spindle stay bolt drilling machine.

The Rock Island List

One 52-in. carwheel turning lathe; 240-volt, direct current motor, push button control.

One 54-in. vertical boring machine, 440-volt, 3-phase, 60-cycle, alternating current motor, push button control.

One 48-in. turning and boring mill, belt or motor drive.

The Morton Mfg. Co., 5133 West Lake Street, Chicago, manufacturer of railroad supplies, will build a two-story factory, 85 x 220 ft., to cost \$95,000. James Burns, 64 West Randolph Street, is architect.

The C. E. Peterson Co., 4914 Wentworth Avenue, Chicago, will build a one-story planing mill, 100 x 254 ft. and 101 x 215 ft., at 8100 South Hoyne Avenue, to cost \$250,000. S. F. Davidson, 53 West Jackson Boulevard, is architect.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, will build an addition to its Crawford Avenue central station, to cost between \$2,000,000 and \$3,000,000. Graham, Anderson, Probat & White, 80 East Jackson Boulevard, are architects.

The Roxana Petroleum Corporation, St. Louis, owned by the Royal Dutch Shell syndicate, will build a \$5,000,000 refinery at Gary, Ind. It is also contemplating the construction of a pipe line from East St. Louis to Gary. Crude oil from the company's Mexican field is now shipped by water to its refinery near St. Louis.

The Minnesota State Department of Administration and Finance, St. Paul, Minn., will ask bids in March for the construction of a power plant at the State Teachers College, Duluth, Minn., to cost \$80,000. C. H. Johnston, Capital Bank Building, St. Paul, is architect.

The C. H. Hoppe Foundry Co., 355 West Grand Avenue, Chicago, has been incorporated to manufacture gray iron and semi-steel castings. Officers are: C. H. Hoppe, president; John Napier, vice-president; and E. T. Fisher, secretary and treasurer.

The Hyman-Michaels Co., Peoples Gas Building, Chicago, has purchased the Mammoth, Keystone & Kennett property of the United States Smelting, Refining & Mining Co., Boston, Kennett, Cal. In addition to the plant the purchase covers all personal properties including a considerable amount of railroad equipment and trackage. The Hyman-Michael Co. will probably operate a part of the plant.

The Niemann Table Co., Cottage Grove Avenue and Seventy-seventh Street, Chicago, will select an architect soon to prepare plans for its one-story factory at Cottage Grove Avenue and Ninety-fifth Street, to cost about \$100,000 with machinery. F. W. Niemann is president.

The Illinois Power & Light Corporation, Illinois Merchants' Bank Building, Chicago, has acquired about 80 acres adjoining its power plant at Venice, Ill., and plans the construction of a new unit to double the present capacity, making a total output of 60,000 kw. A new turbo-generator, steam power equipment and auxiliary machinery will be installed. Extensions will be made in transmission lines. The entire project will cost approximately \$4,000,000.

The Blackhawk Foundry & Machine Co., 323 Clark Street, Davenport, Iowa, is considering a two-story foundry addition at Hobson and Clark Streets, 100 x 110 ft. It is expected to break ground in the spring.

The Board of Education, Alton, Ill., will soon ask bids on a general contract for its proposed three-story and basement high school, with manual training department, estimated to cost \$400,000. Royer, Danely & Smith, Flat-Iron Building, Urbana, Ill., are architects.

The Stromberg Motor Devices Co., 68 East Twenty-fifth Street, Chicago, has preliminary plans under way for new works at Fifty-fourth Avenue and Sixteenth Street, Cicero, Ill., to cost more than \$2,500,000 with machinery. It is expected to break ground during the summer. N. Max Dunning, 304 South Wabash Avenue, is architect.

The Neverslip Chain Co., Boulder, Colo., now being organized by H. H. Donnelley, Boulder, and associates, contemplates the early establishment of a plant for the manufacture of steel chains for automobile and other service.

The Northland Oil Co., 514 Prior Avenue, St. Paul, Minn., has plans for a two-story storage and distributing

plant, 50 x 125 ft., on Cleveland Avenue, estimated to cost \$45,000 with equipment. J. R. Leach is secretary.

The Western United Corporation, Aurora, Ill., operating electric light and power properties, has arranged for a bond issue of \$3,000,000, a portion of the proceeds to be used for extensions and improvements.

The Lake Shore Steel & Machinery Co., 168 North Michigan Avenue, Chicago, is in the market for twist drills, reamers, milling cutters and other cutting tools in surplus stock lots.

The Common Council, Harrold, S. D., is planning for extensions and improvements in the municipal electric power station, with the installation of improved equipment. A proposition is also under advisement for the construction of a new municipal power plant.

Cincinnati

CINCINNATI, Feb. 15.

A FURTHER recession in machine tool buying has taken place the past week. With only a few exceptions sales have been confined to single machines. While inquiries are of considerable volume, purchasers are slow in closing and are demanding quick delivery, indicating that they have waited as long as possible before ordering tools. Business placed lately has been principally from companies in the general industrial field. Local builders believe that they will have to depend upon orders of this type for the bulk of the 1926 bookings, because both the railroads and automobile makers are not buying as liberally as was expected.

Production has not yet been seriously affected by the decrease in new business. Many builders still have a moderate number of orders to be filled, and few manufacturers have tools in stock. Several large companies cannot promise delivery in less than six to eight weeks, while some smaller concerns have sufficient business ahead to insure operation at the present rate until April.

The Chrysler Motor Corporation bought four 17-in. lathes from a local builder. The Cincinnati Planer Co. sold a 30-in. planer in the Northwest. The Big Four railroad purchased a combination journal turning and axle lathe for its Bellefontaine, Ohio, shops from the Niles-Bement-Pond Co. The H. B. Smith Co., Westfield, Mass., took a 4-ft. Morris radial drill, and the New York Central bought two 24-in. Aurora drills. The Banner Machine Co., Pittsburgh, and the Hancock Valve Co., Boston, have each purchased a turret lathe. The American Laundry Machinery Co. is the buyer of a turret lathe for its Rochester, N. Y., plant. The Westinghouse Electric & Mfg. Co., Pittsburgh, bought a large lathe locally. The United States Government purchased a 36-in. lathe for shipment to North Bend, Ore. A local builder sold a 36-in. lathe to a company in Mississippi and a similar machine for shipment to Alaska. The New York Central is inquiring for two 25-in. x 12-ft. engine lathes. The Fawcett Machine Co., Pittsburgh, bought a 36-in. lathe. The Van Dorn & Dutton Co., Cleveland, and the Ackermann Mfg. Co., Wheeling, W. Va., each bought a turret lathe. The American Can Co. purchased a turret lathe for its Newark, N. J., plant. The Cincinnati Engineering Tool Co., Cincinnati, has bought a spline milling machine.

The used machinery market is strong, and dealers are able to command exceptionally good prices. Among recent sales are a 48-in. Pond planer and a 19-in. lathe for the Treadwell Engineering Co., Easton, Pa., and a Norton grinder for the Kokomo Automotive Mfg. Co., Kokomo, Ind.

The Dayton Portland Cement Co., Dayton, Ohio, has been formed with a capital stock of \$1,000,000. Construction of a plant at Germantown, Ohio, will be started in the near future. James F. Gibbons, manager Gibbons Hotel, Dayton, is president.

The Shriver Iron Works, Maryville, Tenn., has been incorporated to take over the business formerly conducted by the McNaughton Mfg. Co., the latter company having for some time specialized in shaking grates and boilers.

Contract for a Government air service station at Wright field, Dayton, Ohio, has been placed with J. I. Gelger, 28 Maple Street, Dayton. It will include an administration building and a one-story and part basement laboratory, 300 x 480 ft.

The Danville Concrete Products Co., Danville, Ky., contemplates the erection of a plant for the manufacture of concrete products.

The Portsmouth Structural Steel Co., Portsmouth, Ohio, recently organized with a capital of \$50,000, has acquired property on Eleventh Street for a proposed one-story steel fabricating plant, for which work will begin at once. Maltby J. Ruggles, Sr., and Fred M. Ruhman head the company. S. R. Wolfe is engineer and manager.

The Board of Education, Dayton, Ohio, is considering the installation of manual training equipment in its proposed two-story junior high school on Huffman Street, to cost \$300,000, for which bids are being asked on general contract until March 8. Herman & Brown, Reibold Building, are architects.

Fire, Feb. 8, destroyed a portion of the United States aircraft plant at the Fairfield Air Intermediate Depot, Dayton, Ohio, known as the Wilbur Wright field, with loss estimated at \$250,000, including equipment. One of the main engine and repair shops and reclamation works were destroyed. Plans for rebuilding will soon be considered. The Air Service, United States Army, Washington, is in charge.

The Rowan County Freestone Co., Farmers, Ky., has inquiries out for a hoisting engine, complete with boiler and accessories.

The Kentucky Hydro-Electric Co., Louisville, has secured a preliminary permit for the construction and operation of a hydroelectric generating plant on the South Fork of the Kentucky River, vicinity of Booneville, with power dam and transmission system. The development will approximate 10,000 hp., and will cost more than \$1,500,000.

The new plant of the Dreses Machine Tool Co., 227 West McMillan Avenue, Cincinnati, manufacturer of radial drills, etc., will be used largely as a foundry; several traveling cranes will be installed. It will be one-story, 90 x 300 ft., and cost approximately \$100,000 with equipment. A general contract has been let to the Austin Co.

The Campbell & Dann Mfg. Co., Tullahoma, Tenn., is inquiring for equipment in connection with rebuilding its hardwood mill recently destroyed by fire, including wood-working tools, binding machines, 125 to 150 hp. Corliss engine and auxiliary power equipment, planer and other machinery. J. M. Ransom is vice-president.

The Tennessee Copper & Chemical Co., Nashville, Tenn., has acquired the plant and business of the Calumet Fertilizer Corporation, New Albany, Ky., heretofore controlled by the United Fertilizer & Fertilizer Products Co., Chicago. The new owner is considering plant expansion and improvements.

E. D. Watkins, Irvine, Ky., has inquiries out for a quantity of brick-making machinery.

The Ohio Edison Co., Springfield, Ohio, is completing plans for a new steam-operated electric power plant near Springfield, with initial station, one-story, 40x420 ft., with a capacity of 27,000 hp., estimated to cost \$1,350,000, with transmission lines. Four additional units of the same size will be installed later. C. I. Weaver is vice-president.

The John C. Vance Iron & Steel Co., Carter Street, Chattanooga, Tenn., has closed negotiations for the purchase of the foundry of the Lucey Mfg. Co., Grove and Nineteenth Streets, and will use for expansion.

Detroit

DETROIT, Feb. 15.

TENTATIVE plans are being considered by the American Standard Tool Works, Inc., Pontiac, Mich., for a one-story addition to cost \$70,000. It is expected to begin work in the spring. G. W. Wiard is secretary and treasurer.

The Arnold Check Writer Co., Inc., Grand Ledge, Mich., recently organized with a capital of \$100,000, has arranged for the early removal of its plant to Flint, Mich. It is purposed to increase production and additional equipment will be provided.

The Michigan Steel Corporation, Wyandotte, Mich., has recently taken out a permit to build a one-story addition, to cost \$45,000 with equipment.

The American Seating Co., Grand Rapids, Mich., manufacturer of car seats, etc., has acquired the local grain mill of Llewellyn & Co., for \$90,000 and will use the property for future expansion. Proposed remodeling is expected to be deferred for several months.

The Packard Motor Car Co., East Grand Boulevard, Detroit, will soon begin the construction of a two-story service works, 139 x 148 ft., with parts department, estimated to cost \$150,000. Albert Kahn, Marquette Building, is architect.

The Board of Education, Battle Creek, Mich., plans the installation of manual training equipment in its proposed two-story junior high school to cost \$500,000, for which

bids will be asked soon on a general contract. J. D. Chubb, 109 North Dearborn Street, Chicago, is architect.

The Sheet Aluminum Corporation, Detroit, will soon begin operations at a new plant at Jackson, Mich., comprising the former works of the Potter Mfg. Co., devoting production to aluminum sheets for automobile body, utensil and other ultimate manufacturing. Facilities will be provided for the employment of about 200. The plant will cost about \$300,000 with machinery. John A. Lang, Jackson, is president, and W. J. Moore, vice-president.

In connection with rebuilding its plant recently destroyed by fire, the American Wood Rim Co., Onaway, Mich., plans to establish the main manufacturing division at Alma, Mich., maintaining a bicycle rim plant, as well as saw mill and lumber plant at Onaway. Arrangements are being completed for the Alma works and operations are expected to begin soon.

The Board of Education, Royal Oak Township, Royal Oak, Mich., is considering the installation of manual training equipment in the proposed three-story high school to be erected at Berkley, Mich., to cost \$160,000, for which bids will soon be asked on a general contract. Lane, Davenport & Peterson, Charlevoix Building, Detroit, are architects.

The Port Crescent Sand & Fuel Co., Port Austin, Mich., has tentative plans for extensions, including additions to the sand-loading plant and installation of new machinery.

The Metal Office Furniture Co., Grand Rapids, Mich., is considering the construction of a new power house.

The Muskegon Light & Power Co., Hersey, Mich., has preliminary plans for the construction of a new hydroelectric plant near Paris, Mich., with an initial output of 4500 kw. W. H. Allswede is in charge.

Milwaukee

MILWAUKEE, Feb. 15.

WHILE current orders are only of moderate volume and from widely scattered sources, with individual purchases small, the character of inquiry for machine tools gives promise of an upward trend in new business. There has been no particular recession in trade, although advancement has been rather slow. Local machine shops are doing considerable replacement from time to time, but instances of shop expansion requiring large-lot buying are rare. Tool builders manage to operate without decline and look forward to a continuance of this situation, with probable betterment before spring.

The A. B. & B. Sheet Metal Works, 3300 Fond du Lac Avenue, Milwaukee, closes bids today for the construction of an addition, 34x130 ft., part two stories and basement. The architect is Herman J. Esser, 80 Wisconsin Street.

The Milwaukee Central Board of Purchases, City Hall, is asking bids until March 15 for a complete stationary asphalt plant for installation in the new municipal service building at Sixteenth and Canal Streets. Joseph W. Nicholson is chief buyer.

The O'Neil Duro Co., 297 East Water Street, Milwaukee, which has acquired the former plant of the Industrial Controller Co., 886 Greenbush Street, has let the general contract to William H. Roberts, 151 Farwell Avenue, for remodeling it into a paint and varnish manufacturing plant and for adding two full stories, 60x124 ft., at an estimated cost of \$100,000, including equipment. George F. O'Neil is president and James S. Motter vice-president and general manager.

The Tennyson Mining Co., Potosi, Wis., has been incorporated with \$25,000 capital stock to engage in the mining and milling of lead, zinc and spelter in the southwestern Wisconsin field at Potosi. The principals are Adam Plummer, George Wallenhorst, Joseph Schmitz and J. T. Walsh. Plans have not been completed.

The Common Council, Baraboo, Wis., will close bids March 2 for one single acting triplex pump of 450 gal. per min. capacity for the water department. H. E. French is city clerk.

The Armco Metal Products Co., Delavan, Wis., has been organized to manufacture a line of art metal goods, stampings, wire goods and forgings. Most of the equipment required for the present has been purchased.

Swift & Co., 76 West Monroe Street, Chicago, let the general contract to the Ludolf Hansen Construction Co., Green Bay, Wis., for additions to and alterations in the branch warehouse and cold storage plant at Green Bay, Wis., to cost about \$75,000. Artificial refrigerating equip-

ment and other mechanical needs are about to be placed.

The Milwaukee Central Board of Purchases, City Hall, is inquiring for one stone crusher plant, a concrete paving outfit, one 8-ton tandem roller, and other machinery for the department of public works.

The Cortsa Mechanical Laboratories, 485-487 Sixth Street, Milwaukee, have incorporated under the same name with a capital of 5000 shares of common stock without par value. Electrical motors and other kindred mechanical devices and specialties are manufactured. The plant will be enlarged. Reimar F. C. Kurtze is chief engineer.

The Highway Machinery Co., Waukesha, Wis., has been incorporated with capital stock of \$20,000 and has succeeded to the business of the Hicken-Grover Co., manufacturer of portable gravel crushing machines. The Hicken-Grover Co. has been assembling these machines in its own shop, but the new company, the Highway Machinery Co., will let the work out on contract.

South Atlantic States

BALTIMORE, Feb. 15.

D. C. ELPHINSTONE, 120 South Calvert Street, Baltimore, machinery dealer, has inquiries out for a 25-ton crane, about 50-ft. boom.

The Wilson-Nash Motor Co., 1109 Cathedral Street, Baltimore, local representative for the Nash automobile, will soon ask bids on revised plans for a one-story service, repair and garage building, 150 x 250 ft., to cost about 110,000 with equipment. Owens & Sisco, Continental Building, are architects.

Headquarters of the American Jobbers Supply Co., Baltimore, which proposes to build a plant at Ninth and Chesapeake Streets, are in the Woolworth Building, New York. The works will be devoted to electric pole-line equipment, cross-arms, etc., and is expected to cost 50,000. H. L. Joslyn is president.

The Atlantic Sheet Metal Works, Inc., Marietta Street, Atlanta, Ga., has plans for a one-story addition, to cost about 17,000, for which superstructure will soon begin.

Ovens, power equipment, conveying and other machinery will be installed in the proposed plant to be erected by the National Biscuit Co., 85 Ninth Avenue, New York, at Hill and Hunter Streets, Atlanta, Ga., to cost \$1,000,000 with equipment.

The Roseboro Mills, Inc., Roseboro, N. C., plan the early purchase of equipment for a machine shop, including lathe with 16-in. swing, 10-ft. bed; drill press, universal milling machine, small tools, etc.

Fire, Feb. 5, destroyed a portion of the machine shops of the Savannah & Statesboro Railroad Co., Statesboro, Ga., with loss reported at \$28,000 including equipment. It is planned to rebuild.

C. A. Sisson, Atlanta, Ga., has awarded a general contract to C. D. Crockett & Co., Bona Allen Building, for a three-story automobile service, repair and garage building, to cost \$175,000 with equipment.

A. H. Cottingham, general manager, Victor-Monaghan Co., Greenville, S. C., operating a cotton mill, is said to be at the head of a project to establish a plant for the manufacture of special textile machinery, including spinning equipment, parts, etc.

The Ramseur Furniture Co., Ashboro, N. C., has plans for an addition, to cost 100,000 with machinery, for which superstructure will soon begin. E. C. Watkins is secretary.

Carter's Production Works, Inc., Wilmington, N. C., machinery dealer, is in the market for a screw-cutting engine lathe, 16-in. swing, about 12-ft. bed, with chucks and complete accessories.

The Durham Fruit & Produce Co., Durham, N. C., recently formed with a capital of \$200,000, contemplates the installation of a cold storage and refrigerating plant in a proposed fruit and produce building, estimated to cost \$80,000. William E. Griffin is general manager.

The Novelty Steam Boiler Works, Inc., 917 South Howard Street, Baltimore, has acquired the real estate, plant and portion of equipment, including structural iron machinery and cranes, of the Chesapeake Iron Works, Westport, Baltimore, and contemplates the establishment of a new plant at this location. Other equipment at the Chesapeake works has been sold and will be removed.

A new corporation has been formed to take over the plant and business of Murrill & Keizer, 206 North Holliday Street, Baltimore, general machinists and manufacturers of machinery. The new company will be owned and operated by about 50 employees, James L. Murrill and Lewis M. Keizer, retiring from the business, turning the property over to the workers without compensation. William G. Thumm

has been elected president; James L. Murphy, secretary, and Oscar R. Jackson, treasurer.

The Shutt Construction Co., Inc., 509 North Charles Street, Baltimore, is said to be planning the early purchase of a quantity of contractors' machinery and equipment.

The City Council, Danville, Va., is planning the installation of automatic stokers and other equipment at the municipal power station.

R. S. Green, Inc., 3232 Frederick Avenue, Baltimore, building materials and equipment, has awarded a general contract to J. Raymond Gerwig, 213 St. Paul Street, for a four-story addition for warehouse and distributing service, estimated to cost \$75,000. Robert S. Green is president.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a flooring machine, Yates or Berlin.

The Atlantic Roofing & Supply Co., Inc., Savannah, Ga., recently organized, has leased about 6000 sq. ft. of floor space from the Merchants & Miners Transportation Co., 636 River Street, West, for a new sheet metal works for the production of roofing and kindred products. The company contemplates the establishment of another plant later for the manufacture of portable steel buildings. L. K. Roberts and W. F. Cook head the company.

The Tom Houston Mfg. Co., Columbus, Ga., plans the early purchase of woodworking and lumber mill equipment, including a universal rip saw, complete with saw table about 36 x 48 in., saw about 12 in. diameter.

Lewter F. Hobbs, National Bank of Commerce Building, Norfolk, Va., machinery, has inquiries out for woodworking machinery, including portable bench saw, portable jointer, cut-off and rip saws, bench jointer, etc.

D. R. Trippett & Co., Macon, Ga., recently organized, have leased property adjoining the plant of the Williams Mfg. Co., and will soon begin the erection of a new hardwood lumber mill, to cost about \$45,000 with equipment. D. R. Trippett is president. T. W. Ashby and Paul Rush, interested in the new company, will also be officers.

J. W. Marshall, West Point, Va., plans the installation of crushing machinery to handle oyster shells and kindred specialties, sling hammer type preferred.

Pacific Coast

SAN FRANCISCO, Feb. 15.

PROPERTY at First and Anderson Streets, Los Angeles, has been acquired by the Link-Belt, Meese & Gottfried Co., 400 East Third Street, manufacturer of chain belts, conveyor systems, etc., to be used for a new plant. It is said that plans will be placed in progress at an early date.

The National Ice & Cold Storage Co., Postal Telegraph Building, San Francisco, has acquired property at Yuba City, Cal., 80 x 265 ft., as a site for a proposed cold storage and refrigerating plant to cost \$40,000.

The Arizona Edison Co., Bisbee, Ariz., is disposing of a bond issue of \$2,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. E. J. Condon is president.

The F. A. B. Mfg. Co., 1850-62 Seventh Street, Oakland, Cal., manufacturer of pumping machinery and parts, has awarded contract to the C. Shearer Co., 698 Bruckhurst Street, for its proposed one-story and basement addition, 60 x 200 ft., to cost \$30,000.

The Oregon Pulp & Paper Co., Salem, Ore., has plans under consideration for extensions and improvements in its mill, including the erection of a new unit, estimated to cost \$400,000 with equipment.

Addison-Miller, Inc., Hillyard, Wash., operating the Great Northern ice-manufacturing plant, is considering the construction of a new plant at Spokane, Wash., with initial capacity of 85 tons per day, to cost \$150,000 with machinery.

The Harbor Island Brass Foundry, 2934 Westlake Avenue, North, Seattle, has plans for a one-story foundry for which foundations will soon be laid.

The Plant Rubber & Asbestos Works, Inc., 537 Brannan Street, San Francisco, will rebuild the portion of its plant at Redwood City, Cal., recently destroyed by fire, with loss of \$200,000 including machinery. C. A. Wright is vice-president.

Bids are being asked by the Water and Power Commission, 207 South Broadway, Los Angeles, until Feb. 26, for electric generating equipment, hydraulic equipment, and other electrical apparatus, specification P-376. James P. Vroman is secretary.

Dodge A. Reidy, 821 Market Street, San Francisco, architect, has filed plans for a two-story automobile service, repair and garage building, to cost about \$100,000 with equipment.

S. Carusa & Brother, Pittsburg, Cal., will proceed with the erection of a one-story ice-manufacturing plant, 45 x 180 ft., with cold storage plant adjoining, to cost about \$40,000.

The Northwest Steel & Metal Products Co., Seattle, care of the Austin Co., Dexter-Horton Building, architect and contractor, has plans under way for a new one-story plant, to cost approximately \$22,000 with equipment.

The Portland Galvanizing Works, Inc., Portland, Ore., will build a two-story plant, 52 x 90 ft., to cost about \$18,000.

The Foss Heating & Sheet Metal Co., 34 East Holly St., Pasadena, Cal., has been incorporated with capital stock of \$25,000 to manufacture gas furnaces. The company would like to receive catalogs from manufacturers of sheet metal and copper products. W. E. Foss is president; J. W. Anger, vice-president and general manager and R. T. McCallum, secretary and treasurer.

Indiana

INDIANAPOLIS, Feb. 15.

CONSTRUCTION has been started by the Enos Coal Mining Co., Oakland City, Ind., on a new plant about six miles from the city limits for the manufacture of liquid oxygen. It will be equipped with air compressors and other power equipment and is reported to cost \$60,000.

The Irvington Sheet Metal Shop, Indianapolis, has arranged for the removal of its plant from 5446 East Washington Street to 426 South Meridian Street, where additional facilities will be provided.

The Early & Daniel Co., Carew Building, Cincinnati, has completed plans for a new grain elevator at Beech Grove, Ind., with capacity of 1,100,000 bu. Elevating, conveying, screening and other machinery will be installed. It will cost about \$400,000 with equipment. Bacon & Tislow, 31 West Ohio Street, Indianapolis, are architects and engineers.

The General Electric Co., Broadway, Fort Wayne, Ind., will soon begin work on its proposed one-story, sawtooth roof foundry addition, 80 x 120 ft., to cost about \$75,000 with equipment. A general contract for erection has been awarded to the Buesching-Hagerman Co., Fort Wayne.

The Board of School Commissioners, 150 North Meridian Street, Indianapolis, plans the installation of manual training equipment in the proposed new high school for colored students, Brown & Mick, city, contractors, to cost \$525,000, for which foundations will soon be placed under way. Harrison & Turnock, Indianapolis, architects.

The Evansville Auto Parts Co., 415 South Fourth Street, Evansville, Ind., has awarded a general contract to the Tri-State Contracting Co., for a one-story addition, 40 x 82 ft.

The Central Indiana Power Co., Indianapolis, operating the Merchants' Light & Heat Co., and other local light and power utilities, will remodel the former works of the Home Brewing Co., for a new steam power plant, removing a present station of the Merchants' company, now on South New Jersey Street to this location and installing considerable additional equipment.

The Kaut Kut Tube Products Co., Goshen, Ind., manufacturer of metallic and other tubing, is reported to be considering the erection of a new branch plant at Elkhart, Ind., to cost \$35,000 with equipment.

The Henry Weis Mfg. Co., Atchison, Kan., manufacturer of sheet metal products, will soon begin work on a new branch plant at Elkhart, Ind., one-story, to cost \$60,000 with equipment. Henry Weis is president.

The Board of School Trustees, Francisco, Ind., is considering the installation of a manual training department in a proposed two-story township consolidated grade and high school, estimated to cost \$100,000, for which bids are being asked on general contract until Feb. 27. Alfred E. Neucks, Old National Bank Building, Evansville, Ind., is architect.

The Frank Fishback Co., Indianapolis, has awarded a general contract to Leslie Colvin, Indianapolis, for a six-story reinforced concrete building for which conveying machinery will be required.

Canada

TORONTO, Feb. 15.

GENERAL interest in the machine tool market is improving. Inquiries are increasing and those now before the trade are of a nature that usually result in orders. The automotive industry has resumed buying on a fairly large scale and orders for two or three tools from this source

are appearing frequently. Several large industrial plants are under construction and dealers and builders are expecting announcement of equipment needs from this quarter soon. The railroads have recently placed large orders for rolling stock which are expected to be reflected in a stronger tool demand from shops handling this business. The machine shops of British Columbia report generally improved conditions and several have additions under way or in prospect for which considerable equipment will be required. The shops of eastern Canada also report a better business outlook.

The St. Maurice Valley Corporation, Three Rivers, Que., has started work on new sulphite mill at Shawinigan Falls, Que.

The Steel Co. of Canada, Ltd., with head office at Hamilton, Ont., has awarded a general contract to John MacGregor, Ltd., 121 Bishop Street, Montreal for an addition to its plant at St. Henry, Montreal.

The Chatham Malleable & Steel Co., Chatham, Ont., expects to double the capacity of its plant this year. It is now enlarging its works and installing considerable new machinery, as well as rearranging other equipment. The company manufactures automobile parts and stampings, sugar beet machinery, etc. W. H. Westman is president.

W. C. Smith, Oshawa, Ont., city engineer, will receive proposals on a new pump for the waterworks station. The estimated cost is \$4,000.

The development of hydro power at the Upper Falls on the Sissiboo River, at Digby, N. S., is proposed. W. I. Snooks, electrical engineer, St. John, N. B., has prepared estimates for a 200-hp. plant to cost \$40,000. H. H. Marshall, Digby, is chairman of the committee in charge.

The City Council, Fort William, Ont., has authorized the expenditure of \$250,000 on a hydro substation and transformer station, on which work will start as soon as plans have been completed. Alex. McNaughton is city clerk.

MacFarlane, Pratt & Hanley, Midland, Ont., will build a 2,000,000 bu. elevator to cost \$1,000,000. Work will be rushed so that it will be ready to handle the 1926 grain crop next fall.

Bids for the construction of a plant at Trenton, Ont., for the Hinde & Dauch Paper Co., Toronto, are now being called. It will cost \$150,000 and work will start next month. Between \$200,000 and \$300,000 will be spent on equipment.

Western Canada

Plans are under way for the construction of a grain elevator in the eastern part of North Vancouver, B. C., by the Grain Producers, Ltd. It will have a capacity of 2,225,000 bu. and will cost \$2,500,000.

Bids will be received at the office of C. J. Brown, city clerk, Winnipeg, until March 1, for six 5000 kva., single phase transformers, three to be delivered to the terminal station, Winnipeg, and three to the power house at Pointe du Bois. Specifications are at the office of the Winnipeg Hydro Electric System, 55 Princess Street.

Foreign

THE International Power Securities Corporation, J. E. Aldred, head of Aldred & Co., 42 Wall Street, New York, president, is disposing of a bond issue of \$5,000,000, a considerable portion of the proceeds to be used for extensions and improvements in foreign power utilities, including the Italian Gas Co., Turin, Italy. J. W. Lieb, vice-president of the New York Edison Co., Irving Place and Fifteenth Street, is a director of the company.

The American-Belgian Chamber of Commerce, 48 Rue de Naples, Brussels, Belgium, has received an inquiry (Reference 251) from a company in Belgium desiring to get in touch with American manufacturers of spring steel and steel springs suitable for use for rolling shutters as manufactured by the Belgian concern.

The Government of Chile, Valparaiso, Chile, is planning a hydroelectric power development along the route of the proposed aqueduct from the Andes Mountains for water supply for the city, to be 125 miles long. The generating plant will develop an initial capacity of about 40,000 kw. Information at the office of the Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, reference—Chile 196112; also, at the American Consulate, Valparaiso, C. F. Deichman, consul general.

The British Empire Chamber of Commerce in the United States, 25 Broadway, New York, has received an inquiry (707) from a company in Turkey, desiring to purchase

American galvanized corrugated sheets, enameled ware and hardware, oil engines up to 10 hp., marine motors, T-girders and irons, steel bars for concrete reinforcement, hand balances and weighing machines.

The American Chamber of Commerce in London, Aldwych House, Aldwych Kingsway, London, W.C.2, England, has received an inquiry from the engineer in charge of a proposed 400-mile railroad line in the Near East, desiring to get in contact with American manufacturers of steel rails and pressed steel railroad sleepers.

Trade Changes

The Marshall & Huschart Machinery Co., 17 South Jefferson Street, Chicago, has leased the corner store of the Sharples Building, Washington Boulevard and Jefferson Street, for a period of ten years. The company will establish executive and general sales offices there as soon as alterations are completed.

Butts & Ordway Co., 33 Purchase Street, Boston, iron, steel and heavy hardware, has leased for a term of years the property at 40 to 48 Stanhope Street, that city and after extensive alterations, will move, probably around July 1. The company, in addition to its Purchase Street plant, maintains a warehouse in South Boston and a distributing station on Brookline Avenue, Back Bay. The South Boston and Back Bay units will be combined with the main plant on Stanhope Street. The company was founded in 1888 by the late Frederick H. Butts and Henry C. Ordway. Mr. Ordway retired from the business about 25 years ago. F. Marsena Butts is president and general manager of the company, and Chester C. Butts treasurer. The company has been in its present location some 20 years.

The Domhoff & Joyce Co., Cincinnati, dealer in pig iron, coke and alloys, has been appointed selling agent for the pig iron produced by the Struthers Furnace Co., Struthers, Ohio.

The Monitor Controller Co., Baltimore, manufacturer of automatic controllers for motor-driven apparatus, thermaload across-the-line starters and edgewound resistors, has appointed the Electric Material Co., San Francisco and Los Angeles, its Pacific Coast representative. The Electric Material Co. has been established for a number of years as representative of a number of electrical manufacturers. It is proposed eventually to have some stock of standard equipment carried in San Francisco.

Cellite Products Co., Los Angeles, removed its San Francisco office on Feb. 1, from the Monadnock Building to 140 Spear Street. This change was made to provide larger quarters and better operating facilities.

William Jacks & Co., Ltd., Glasgow, Scotland, iron and steel merchant, for some years represented in the United States by F. W. T. Amis, is undergoing liquidation. William Jacks & Co. of London, England, not related to the Glasgow company, will continue.

The Copper and Brass Research Association, 25 Broadway, New York, announces that the Baltimore Tube Co., Baltimore, has become a member. The Baltimore Tube Co. has been engaged in the manufacture of seamless brass and copper tubing since 1912.

Control and management of the S. R. Smythe Co., 2021 Oliver Building, Pittsburgh, consulting and contracting engineers, now is vested in L. S. Schmidt, president, Rowland Young, secretary-treasurer, and James Criswell, vice-president. These men have all been identified for many years with the Smythe company, which was founded in 1882 by S. R. Smythe and continued until his death about a year ago by his brother, H. E. Smythe. The company is building the open-hearth furnaces and soaking pits for the Ford Motor Co., Detroit, a line of work in which it has long been conspicuous.

The Erie Foundry Co., Erie, Pa., manufacturer of steam, air and board drop hammers and trimming presses and other forge shop equipment announces the opening of several district sales offices. One at 1120 Myrtle Avenue, Plainfield, N. J., will be in charge of Howard Terhune; a Chicago office, at 549 Washington Boulevard, will be in charge of L. F. Carlton. R. B. McDonald will be manager of the Detroit district office located at 408 Donovan Building.

The Miller Machinery Co., A. T. Miller, president, and J. Maxwell, sales manager, 211 Perry Payne Building, Cleveland, has been appointed representative for the Cleveland territory by the Carle Machinery Co., Kokomo, Ind.

New Bethlehem Office at Portland, Ore.

The Bethlehem Steel Co. opened a new branch office in Portland, Ore., on Feb. 1, in charge of Frank Nickerson, who has been in the sales offices of the company in San Francisco for several years. The company is also con-

sidering the opening of a branch office in Vancouver, B. C. The Seattle offices, in charge of W. C. Scott, Jr., sales agent, have been removed to Room 410-411 L. C. Smith Building. The Bethlehem company is advantageously located for Pacific Coast trade with an all-water haul from Sparrows Point of 30c. a ton. From Pittsburgh to tide-water alone the rail rate is 31c. per 100 lb.

Industrial Items

The second annual sales conference of the Climax Engineering Co., Clinton, Iowa, was held at Clinton, Jan. 16, and manufacturers and dealers of road-making machinery attended the gathering. The conference was held under the chairmanship of President George W. Dulany, Jr. Among those who spoke were: H. H. Waters, chief engineer, H. E. Riggs, production manager, L. Dunlevy, sales manager, R. C. Rowan, general manager, Norman McCarty, Diesel engineer, and R. L. Alexander, refrigeration manager.

The Witters Foundry Supply Co. has engaged in business in Milwaukee as a distributor of foundry supplies and equipment. An office and warehouse have been leased at 488 Virginia Street, that city, and the company will carry in stock a complete line of supplies for foundries. This company will also be distributor for the foundry equipment manufactured by the E. J. Woodlson Co.

Rolls-Royce of America, Inc., Springfield, Mass., announces changes in the personnel of Brewster & Co., Long Island City, N. Y., automobile body builders, recently acquired. Henry J. Fuller, president Rolls-Royce of America, Inc., becomes chairman of the board of directors of the subsidiary; W. E. Hosac is vice-president in charge of sales; H. C. Beaver, treasurer and vice-president; P. B. Brewster, assistant treasurer and secretary; John Southern, general manager. E. W. Caswell succeeds Mr. Southern as general manager of the Springfield plant. William Brewster, grandson of the founder of the subsidiary, continues as president.

The Tonawanda Electric Steel Casting Co., 5 Mechanic Street, North Tonawanda, N. Y., is successor to the Niagara Electrical Steel Corporation. The officials of the new company are: L. J. Fitzpatrick, president, formerly with Pratt & Letchworth; Fred J. Still, vice-president, formerly with Pratt & Letchworth and the Atlas Steel Corporation, Cleveland; S. F. Towne, secretary and treasurer, formerly with the McKinnon Dash Co., Buffalo.

The Universal Steel Co., 2966 East Fifty-fifth Street, Cleveland, is having heavy Bliss shears installed in its new warehouse. A special crane system is being installed by the Cleveland Crane & Engineering Co. The company has a fleet of heavy trucks and is having special trailers built for quick and efficient handling in servicing steel plants in its locality. J. Miller, president, was long affiliated with the Columbia Iron & Steel Co. Harry Resnick, secretary, was formerly with Luria Brothers, Pittsburgh, and for 12 years was assistant manager of the Fairbanks Scale Co., Pittsburgh, and later with Bialosky Brothers, Cleveland.

At the annual meeting of the stockholders of the Northern Engineering Works, manufacturer of electric traveling cranes, electric hoists and foundry equipment, Detroit, the following officers and directors were elected: Henry W. Standart, president and treasurer; Harry C. Bulkley, vice-president; Louis H. Ols, secretary. The above, with W. Robertson, chief engineer of the company, and Joel H. Prescott constitute the board of directors.

Branch Office Representatives of The Iron Age

Editorial

Chicago, Otis Bldg.....	R. A. Fiske
Pittsburgh, Park Bldg.....	G. F. Tegan
Cleveland, Guardian Bldg.....	F. L. Prentiss
Cincinnati, First National Bank Bldg.....	Bornham Finney
Boston, Park Square Bldg.....	Gerard Fraser
Washington, Investment Bldg.....	L. W. Moffett
San Francisco, 320 Market St.....	Charles Downes

Advertising

Chicago, Otis Bldg.....	F. S. Wayne
Pittsburgh, Park Bldg.....	W. B. Robinson
Cleveland, Guardian Bldg.....	Emerson Findley
Cincinnati, First National Bank Bldg.....	D. G. Gardner
Boston, Park Square Bldg.....	H. D. Barr
Philadelphia, Widener Bldg.....	Charles Lundberg
Buffalo, Ellicott Sq.....	B. L. Herman
Detroit, 7338 Woodward Ave.....	Peirce Lewis
Hartford, Conn., P. O. Box 81.....	D. C. Warren
Northern New Jersey, Hotel Regent, 93 Bleeker St., Newark, N. J.....	W. C. Sweetser
New York, 239 West Thirty-Ninth St.....	P. W. Schultz, C. L. Rice, E. Hinck
San Francisco, 320 Market St.....	W. A. Douglass

Current Metal Prices

On Small Lots, Delivered from Stocks, New York

THESE prices are given for the convenience of small-lot buyers whose requirements do not run into mill-size orders.

Only base prices can be listed in some cases, due to limits of space; other items of a given group are deducible from the base price.

The prices which are quoted below are those at which small lots may be bought, whether from jobbers' or other stocks.

Complete market reports and prices on large shipments from mills will be found elsewhere under "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates		Per Lb.
Bars:		
Refined iron bars, base price	.....	3.24c.
Swedish charcoal iron bars, base	.....	7.00c. to 7.25c.
Soft steel bars, base price	.....	3.24c.
Hoops, base price	.....	4.49c.
Bands, base price	.....	3.99c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	.....	3.34c.
Channels, angles and tees under 3 in. x ¼ in. base	.....	3.24c.
Steel plates, ¼ in. and heavier	.....	3.34c.

Merchant Steel		Per Lb.
Tire, 1½ x ½ in. and larger	.....	3.30c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	.....	3.65c.
Toe-calk, ½ x ¼ in. and larger	.....	4.20c.
Cold-rolled strip, soft and quarter hard	.....	6.25c.
Open-hearth spring steel	.....	4.50c. to 7.00c.
Shafting and Screw Stock:		
Rounds and hex.	.....	4.00c. to 5.00c.
Squares and flats	.....	4.50c. to 5.50c.
Standard tool steel, base price	.....	12.00c.
Extra tool steel	.....	15.00c. to 18.00c.
Special tool steel	.....	20.00c. to 23.00c.
High-speed steel, 18 per cent tungsten	.....	70c.

Sheets		Per Lb.
Blue Annealed		
No. 10	.....	3.89c.
No. 12	.....	3.94c.
No. 14	.....	3.99c.
No. 16	.....	4.09c.

Box Annealed—Black		Long Terme
Soft Steel	Per Lb.	Sheets
C. R. One Pass	Per Lb.	Per Lb.
Nos. 18 to 20	4.30c.	5.75c.
Nos. 22 and 24	4.35c.	5.90c.
No. 26	4.40c.	6.05c.
No. 28*	4.50c.	6.35c.
No. 30	4.70c.	6.85c.

Galvanized		Per Lb.
No. 14	.....	4.60c.
No. 16	.....	4.75c.
Nos. 18 and 20	.....	4.90c.
Nos. 22 and 24	.....	5.05c.
No. 26	.....	5.20c.
No. 28*	.....	5.50c.
No. 30	.....	6.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe		Wrought Iron	
Standard Steel		Black Galv.	
½ in. Butt....	46 29	½ in. Butt....	4 +19
¾ in. Butt....	51 37	¾ in. Butt....	11 + 9
1-3 in. Butt...	53 39	1-1½ in. Butt	14 + 6
2½-6 in. Lap..	48 35	2-in. Lap.....	5 +14
7 & 8 in. Lap.	44 17	3-6 in. Lap... 11	+ 6
11 & 12 in. Lap	37 12	7-12 in. Lap... 3	+16

Bolts and Screws	
Machine bolts, cut thread, 40 and 10 per cent off list	
Carriage bolts, cut thread, 30 and 10 per cent off list	
Coach screws, 40 and 10 per cent off list	
Wood screws, flat head iron,	
80, 20, 10 and 10 per cent off list	

Steel Wire		Per Lb.
BASE PRICE† ON NO. 9 GAGE AND COARSER		
Bright, basic	.....	4.25c.
Annealed, soft	.....	4.50c.
Galvanized, annealed	.....	5.15c.
Coppered, basic	.....	5.15c.
Tinned, soft Bessemer	.....	6.15c.

†Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire	
BASE PRICE	
High brass sheet	.....19½c. to 20½c.
High brass wire	.....19½c. to 20½c.
Brass rods	.....16½c. to 17½c.
Brass tube, brazed	.....27½c. to 28½c.
Brass tube, seamless	.....23¾c. to 24¾c.
Copper tube, seamless	.....24½c. to 25½c.

Copper Sheets	
Sheet copper, hot rolled, 22¾c. to 23¾c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates		Coke—14x20	Prime	Seconds
Bright Tin	Grade "AAA"	Grade "A"	80 lb..	\$6.15 \$5.90
	Charcoal 14x20	Charcoal 14x20	90 lb..	6.30 6.05
	IC..	\$8.85	100 lb..	6.45 6.20
	IX..	12.85	IC..	6.65 6.40
	IXX..	14.40	IX..	7.85 7.60
	IXXX..	15.75	IXX..	9.00 8.75
	IXXXX..	17.00	IXXX..	10.35 10.10
			IXXXX..	11.35 11.10

Terne Plates		14 x 20
IC—8-lb. coating	.....	\$7.75 to \$8.00
IC—20-lb. coating	.....	10.00 to 11.00
IC—30-lb. coating	.....	12.00 to 13.00
IC—40-lb. coating	.....	13.75 to 14.25
Fire-door stock	.....	10.50

Tin	
Straits, pig	.....65c. to 65½c.
Bar	.....69c. to 69½c.

Copper	
Lake ingot	.....15½c.
Electrolytic	.....15¼c.
Casting	.....15 c.

Spelter and Sheet Zinc	
Western spelter	.....9c. to 9¼c.
Sheet zinc, No. 9 base, casks	.....13¼c.; open, 13¾c.

Lead and Solder*	
American pig lead	.....10c. to 11c.
Bar lead	.....12c. to 13c.
Solder, ½ and ½ guaranteed	.....41 c.
No. 1 solder	.....40 c.
Refined solder	.....33¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal	
Best grade, per lb.	.....68c. to 72c.
Commercial grade, per lb.	.....30c. to 35c.

Antimony	
Asiatic	.....24½c. to 26½c.

Aluminum	
No. 1 aluminum (guaranteed over 99 per cent pure), ingots for remelting, per lb.	.....30c. to 30½c.

The market is firm and values in red and yellow metals are advancing. Dealers' buying prices are as follows:

	Cents
	Per Lb.
Copper, heavy crucible	.....12.25
Copper, heavy wire	.....12.00
Copper, light bottoms	.....9.75
Brass, heavy	.....7.25
Brass, light	.....6.25
Heavy machine composition	.....9.00
No. 1 yellow brass turnings	.....8.50
No. 1 red brass or composition turnings	.....8.00
Lead, heavy	.....8.00
Lead, tea	.....6.00
Zinc	.....5.00
Cast aluminum	.....18.50
Sheet aluminum	.....18.50